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ASSESSING THE EFFECTS OF EXTENDED PRACTICE ON LETTER NAMING FLUENCY

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by

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The purpose of this dissertation study was to assess the additive effect (beyond mastery instruction) of extended practice. A multiple baseline design across child participants was used to assess the effects of extended practice of letter names on the rate of correctly identified letter names per minute specific to three Blocks of letters. The study involved three pre-kindergarten children enrolled in preschool located in a medium sized suburban city in Nebraska. Within the study, each child was exposed to three experimental conditions: (A) Baseline, (B) Extended Practice and (C) Outcome Assessment. The (A) Baseline condition covered one, two or three consecutive sessions; for each session, children were administered researcher-created fluency measures at school. The (B) Extended Practice condition was intended to occur over three consecutive sessions at school. Due to the Covid-19 pandemic, this condition was broken into two sub conditions: (B1) Extended Practice at school; (B2) Extended Practice at home; each child experienced extended practice differently. The (C) Outcome Assessment condition covered two non-consecutive sessions one day apart. For each session, children were administered the researcher-created fluency measures. All measures in this condition were intended to be administered at school by the research-

assistant after children completed three consecutive extended practice sessions. Due to Covid-19 pandemic, the assessment procedures varied for each condition. Across child participants, there were no clear intervention effects. For two children, Block 1 fluency scores showed an increase in fluency scores before and after extended practice. However, fluency scores across Blocks 2 and 3 show minimal letter naming fluency gains or a lack of fluency gains before and after extended practice. While it appears that extended practice intervention was ineffective, using these results to judge the efficacy of the extended practice intervention is limited due to adverse effects of the Covid-19 pandemic on the original study methodology. The results, limitations and areas for future research are discussed.

DEDICATION

This dissertation is dedicated to:

Penelope Jones Cooper

Earl Page Cooper

Bill Jones Pearce

Ranger

Lulabelle

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Chapter One

Introduction

Phonemic awareness and letter name knowledge are early literacy skills that have been found to predict reading success (Adams, 1990; Anderson, Hiebert, Scott, & Wilkerson, 1985; National Reading Panel, 2000; Share, Jorm, Maclean, & Matthews, 1984; Snow, Burns, & Griffin,1998). Phonemic awareness is the ability to understand and manipulate phonemes, the smallest units of spoken language (National Reading Panel, 2000). Children with a strong phonemic awareness understand that written words are comprised of individual sounds (Snow et al., 1998; Tankersley, 2005). Letter naming knowledge is the ability to say the names of individual letters in the alphabet (National Reading Panel, 2000). The focus of this study is on enhancing the letter naming fluency of preschool age students.

Letter Naming Knowledge

Research has demonstrated that letter naming knowledge, the ability to name letters accurately is a stable predictor of reading achievement across grades and skill areas. Evidence for the stability of letter name knowledge as predictor of reading achievement is described first. This description is followed by evidence for the prediction of letter name knowledge for varied reading skills. Finally, evidence for the enhanced prediction of letter naming speed over letter name accuracy for reading skills is presented.

Stability of Prediction

Stevenson, Parker, Wilkinson, Hegion, and Fish (1976) reported that letter naming knowledge was a stable predictor of reading achievement across Grades 1, 2, and 3. A longitudinal panel design was used to follow 255 kindergarten children through third grade. Letter-naming knowledge was measured in kindergarten with the Letter Naming subtest of the Wide Range Achievement Test (W-R). Varied measures were used to assess the general reading achievement across 1st, 2nd and 3rd grades. The W-R was used to assess general reading for grades 1-3, the Gray Oral Reading Test assessed reading comprehension for grades 1 and 2, and the Stanford Achievement Test assessed comprehension for children in grade 3. A stepwise regression approach was used to identify the best predictor of reading achievement at each grade. The stepwise regression included a set of cognitive tasks (e.g., serial memory) and teacher ratings of student classroom behavior (e.g., following instructions). The obtained R^2 between letter naming and general reading achievement for grades 1-3 was .62, .69 and .62. Letter names and reading comprehension were correlated at .59 for grade 2 and .45 for grade 3. These results indicate that letter naming knowledge was a stable predictor of general reading achievement.

Another longitudinal study conducted by Muehl and DiNello (1976) explored the extent to which letter name knowledge predicted general reading achievement through 7th grade. The letter name knowledge of 56 first graders was assessed using the Letter Naming subtest of the Harrison-Stroud Reading Readiness Profiles. General reading achievement of these children was assessed in Grades 1-7 using different measures. The

Metropolitan Achievement Test (MAT) was used for grades 1-3 and the Iowa Test of Basic Skills (ITBS) was used for grades 4-7. A multiple regression analysis was used to determine which early literacy skills predicted general reading performance. The multiple regression included the Wechsler Intelligence Scale for Children (WISC) and different skill tests from the H-S Readiness Profiles. The correlations between letter naming and general reading achievement for grades 1-7 were positive, stable and significant: .30, .24, .28, .31, .31, .33, .and 35, respectfully.

Predicting Different Reading Skills

In addition to predicting general reading achievement, letter naming knowledge has been shown to predict performance in pseudoword reading, vocabulary, spelling, phonemic awareness and reading comprehension. Tunmer, Herriman and Nesdale (1988) found that letter naming knowledge was a strong predictor of pseudoword reading and reading comprehension. In a 2-year longitudinal study, 118 children were assessed at the beginning of Grade 1 using a variety of prereading measures including: verbal intelligence, phonological awareness, syntax, pragmatics, vocabulary, high-frequency words and letter name knowledge. Letter name knowledge was assessed using a researcher-created measure that required children to identify the names the upper and lowercase alphabetic letters (Clay, 1979). The Interactive Reading Assessment System (IRAS) assessed reading achievement (e.g., pseudoword decoding, word decoding and reading comprehension) at the end of Grades 1 and 2 (Calfee & Calfee, 1981). A multiple regression analysis was performed to identify the best predictors of reading achievement. The multiple regression analysis included the variables phonological awareness and letter

name knowledge. The standardized regression coefficient for letter name knowledge was positive and significant (.62). Furthermore, correlations between letter name knowledge, pseudoword reading and reading comprehension were positive and significant for both Grades 1 and 2 (.46, .65;.49, .52 respectively). Letter name knowledge assessed in grade 1 was a predictor of first and second grade reading performance.

In another study, Badian (1994) reported that letter naming knowledge assessed in preschool predicted general reading achievement, spelling skills and reading comprehension in first grade. A longitudinal study design was used to follow 118 preschool students (54 boys, 64 girls) through first grade. Letter naming knowledge was measured in preschool using the Holbrook Screening Battery (HSB). Various measures were used to assess reading at different times during the school year. The Weschler Individual Achievement Test (WIAT) assessed general reading achievement and spelling in early first grade. The Stanford Achievement Test (SAT) assessed reading comprehension in late first grade. A stepwise regression analysis was performed to identify the best predictors of first grade reading achievement. The stepwise regression included variables such as age, IQ, socio-economic status and a parent questionnaire rating their child's ability to read (PQ). When controlling for variables IQ and PQ, the partial correlations between letter naming and general reading achievement, spelling and reading comprehension were stable and significant: .37, .36, .38. Furthermore, correlations between letter naming knowledge and general reading achievement, spelling and reading comprehension in first grade were positive and significant .50, .53, .54. Even

when assessed in preschool, letter name knowledge was a predictor of first grade reading performance.

Muter, Hulme, Snowling, and Taylor (1998) also explored letter naming knowledge assessed in preschool and determined that it was a predictor of spelling and reading performance including fluency. In a longitudinal study, Muter and colleagues followed 38 preschool children over a period of two years. Letter naming knowledge was measured in preschool by asking children to identify and name lowercase letters on flashcards. Various measures assessed reading and spelling performance for preschool, kindergarten and grade 1. The British Ability Scales Word Reading Test (BAS) assessed single word reading. The Neale Analysis of Reading Ability assessed reading fluency and the Schonell Graded Word Spelling Test measured single word spelling. A regression analysis to investigate the different predictors accounting for progress in reading and spelling was explored. The regression analysis included the variable phonological skill segmentation. Letter naming knowledge was a significant, independent predictor of reading and spelling in kindergarten ($\beta = 0.43$; $\beta = 0.22$).

Badian (1995) explored the extent to which letter name knowledge predicted vocabulary and phonemic awareness. In a cohort longitudinal panel study, Badian (1995) followed 92 children (48 boys, 44 girls) through elementary grades. Letter naming knowledge was assessed in preschool using a researcher-created measure where children named 13 upper case letters shown on flashcards. The Stanford Achievement Test (SAT) was used to measure reading comprehension, spelling and vocabulary for grades 1-6. The researcher-created Pseudoword Spelling test where children wrote difficult non words

(e.g., scrage, sproke, graif) was used to measure phonemic awareness for grade 3. A stepwise regression analysis was performed to identify the best preschool predictors of reading, vocabulary and spelling. The stepwise regression included variables such as verbal IQ, age and listening comprehension. Partial correlations between the preschool predictor letter naming knowledge with reading comprehension, spelling and vocabulary (i.e., controlling for variables verbal IQ and age) demonstrated that letter naming assessed in preschool significantly predicted reading comprehension (.30, .39, .37, .31., .52, .38), vocabulary (37, .37, .57, .49, .52) and spelling (.39, .48, .36, .35.) for grades 1-6. In addition, a stepwise regression analysis was performed to identify the best preschool predictors of phonemic awareness. The stepwise regression included the variables pseudoword spelling, verbal IQ and age; letter naming made a significant and independent contribution of spelling pseudowords for grade 3:(.40). In summary, this study confirmed the importance of the skill of letter naming as a predictor of reading performance.

Enhanced Prediction of Letter Naming Speed

Children's speed in naming letters is an independent predictor of reading achievement from letter naming accuracy (Foulin, 2005). Using a cohort longitudinal panel study, Walsh, Price, and Gillingham (1988) determined letter recognition speed to be a strong predictor of reading achievement separate from letter naming accuracy. Walsh and colleagues (1988) followed a cohort of 35 kindergarten children and 42 second grade children at two separate schools. Children's letter naming speed (e.g., upper and lower-case letters) was measured in kindergarten and second grade using discrete

trial reaction times. Reaction times were calculated for correct letter responses by averaging reciprocal individual time scores. Letter naming knowledge scores were calculated for each cohort based on children's ability to identify ten lower and upper-case letters. General reading was measured the following school year (e.g., 16 months later) using The Initial Placement Inventory (IPI) (Weinstein, 1980). The (IPI) mastery measure was a series of tests arranged in levels administered gradually over time. A multiple regression analysis was used to identify whether letter naming speed was a separate predictor of reading achievement over letter naming knowledge. The obtained standardized regression coefficients for letter naming speed and letter naming knowledge for kindergarten children demonstrated that letter naming speed made a unique contribution to reading achievement. The standardized regression coefficients for school A and B were (.97 and .27) and (.71 and .21) respectively. Results demonstrate a strong, positive association between letter-naming speed and reading achievement among kindergarten students.

In addition, Speer and Lamb (1976) found that letter recognition speed is a strong predictor of vocabulary and reading comprehension for young children. A longitudinal panel study was used to track 25 children from the beginning of grade 1 to the end of grade 1. Letter recognition speed was measured at the beginning of grade 1 using the researcher-created measure, Say-Letters-Random. For this measure, children were prompted to say as many lowercase alphabetic letters as they could in 1 minute; children completed 10 trials over 10 consecutive school days. Vocabulary and reading comprehension were assessed at the end of grade 1 using the standardized Gates-

MacGinitie assessment. The correlations between letter recognition speed on vocabulary and reading comprehension were positive and significant, .76 and .79 respectively. These correlations suggest that the speed at which children can identify letters is a strong predictor of reading success for children.

Automaticity Training

Central to this research on letter naming knowledge and letter naming speed is automaticity training. Automaticity training allows for fast and effortless processing of fundamental component skills that underlie more complex skills (Chard, Simmons, & Kamé ennui, 1995; Ehri & Wilce, 1979, 1983; Hoover & Gough, 1990). Automaticity training is applicable to multiple areas of daily life from sports to ballroom dancing (Dougherty & Johnston, 1996; Gladwell, 2008). For example, professional dancers spend years practicing fundamental, technical skills at the barre to a level of automaticity in order to help them prepare for different performing roles. Indeed, in many areas such as sports and music, automaticity training of fundamental component skills is conducted on a regular basis even after performers achieve a high level of performance (Dougherty & Johnston, 1996; Ericsson, Krampe, & Tesch-Römer, 1993; Gladwell, 2008).

Automaticity training in education and reading specifically, allows for fast and effortless processing of fundamental literacy component skills that underlie more complex skills (Chard et al., 1995; Ehri & Wilce, 1979, 1983; Hoover & Gough, 1990). Children who lack automaticity of lower level skills are likely to struggle with higher level skills such as fluency and comprehension (Chard, Voughn, & Tyler, 2002; Hudson, Isakson, Richman, Lane, & Arriaza-Allen, 2011). This occurs because difficulties with

lower level literacy skills compromise higher level skills (Levy, Abello, & Lysynchuk, 1997; Perfetti, 1985). For example, a child who struggles to recognize or decode individual words will devote total attention to decoding. When concentration is focused on decoding words, less attention is available to process and comprehend text (Hudson et al., 2011). However, the ability to decode automatically allows for higher order reading skills to be performed effectively and simultaneously (LaBerge & Samuels, 1974; Samuels & Flor, 1997). A specific problem not addressed in the literature are interventions that provide automaticity training of the fundamental literacy component skill letter naming; interventions that focus on effects of achieving automaticity of the early literacy skill letter naming have not yet been explored. For this reason, logical reasoning suggests that improving letter naming fluency will benefit children.

Chapter Two

Literature Review

Targeted instruction of fundamental literacy component skills such as letter names, letter sounds or individual words is fundamental to skill-based reading development (Chard et al., 1995; Ehri & Wilce, 1979, 1983; Hoover & Gough, 1990). Achieving automaticity is the ability to recognize and process fundamental literacy component skills at an unconscious level. Automaticity is defined as fast, effortless processing of fundamental literacy component reading skills necessary for fluent word reading. Achieving automaticity of fundamental literacy component skills is necessary, but not sufficient for reading fluency and comprehension (Wood, Flowers, & Grigorenko, 2001). In other words, within skill-based reading development theories, achieving automaticity of fundamental literacy component skills represents a pressure point to achieving fluent word reading and, in turn, reading comprehension (Ehri & Wilce, 1979, 1983; Hoover & Gough, 1990; Perfetti & Hogaboam, 1975; Torgesen, 1986).

Many scholars that advocate skill-based beginning word reading instruction recognize the importance of providing targeted instruction designed to achieve automaticity or overlearning of fundamental literacy component skills (Ehri & Wilce, 1979, 1983; Hoover & Gough, 1990; Perfetti & Hogaboam, 1975; Torgesen, 1986). In contrast, other scholars believe that such targeted instruction is not necessary to achieve automaticity of fundamental literacy component skills because this is achieved through naturally occurring practice (e.g., reading connected text and/or passages; Engelmann, 1999; Goodman & Goodman, 1979; Treffinger, Davis, & Ripple, 2014).

The basic training approach to achieving a high level of automaticity incorporates four elements (Binder, Haughton, & Bateman, 2002; Ellis & Worthington, 1994). These elements in relation to reading include:

1. Select component skills - When selecting skills for the purpose of developing automaticity, it is critical to choose those with high reaching effects. Typically, fundamental literacy component skills (e.g., letter sounds) are introduced and taught in isolation before they are integrated within higher order skills such as reading fluency or comprehension. For example, letter sounds are first taught in isolation before children use the taught letter sounds to decode words and ultimately read fluently. Automaticity of fundamental literacy component skills plays a critical role in decoding words (Ehri, 1995; Hoover & Gough, 1990) which, in turn, influences student's ability to read fluently and comprehend (LaBerge & Samuels, 1974; Perfetti & Lesgold, 1979).
2. Frequent practice of component skills – Ongoing and frequent practice is necessary to achieve automaticity of fundamental literacy component skills. Nearly every skill can be automatized as a result of practice (Logan, 1997). Frequency of practice involves devoting specific and frequent time for practicing fundamental literacy component skills (e.g., letter sounds) (Kubina & Morrison, 2000; Logan, 1997). As a student increases practice time, this in turn typically leads to increases in the speed of student responses (Logan,

1997). A distinguishing result of automaticity is quick and accurate performance of a skill (Binder, 1996; Bloom, 1986).

3. Practice component skills in manageable quantities - The set of fundamental literacy component skills (e.g., letter names, letter sounds, individual words) must be grouped into and practiced in manageable quantities. Practicing component skills in manageable quantities allows students to practice skills in groups or "chunks" rather than all at once (Binder et al., 2002; Kubina & Morrison, 2000; Logan, 1997). For example, when practicing letter names, rather than incorporating all 26 letters in one practice session, a student should practice groups of letters until they are fluent and accurate. Once student performance reaches a level of fluent and accurate performance, he or she can then practice the next "chunk" of letters until they eventually have practiced all 26 letters.
4. Use of progressive individualized fluency goals - Personalized and progressive fluency goals (i.e., accurate and fast responses) help monitor student progress and maintain student motivation. Achieving automaticity of fundamental literacy component skills involves measuring student performance during practice on a regular basis. While it is common for many classrooms to use accuracy scores to measure progress, accuracy alone gives only general information. Although two students with an accuracy score of 90% have the same score, completing a practice activity in 10 minutes is different than completing it in 30 minutes (Wood, Burke, Kunzelmann &

Koenig, 1978). Thus, measuring automaticity using fluency gives much more specific information about student progress because fluency describes performance (observation) within a specific amount of time (Binder et al., 2002; Kubina & Morrison, 2000).

Pragmatic Challenges to Extended Practice

There are pragmatic challenges to providing varying amounts and personalized opportunities necessary to help achieve automaticity of fundamental literacy component skills. Review of the instructional elements reveals that automaticity training requires additional effort and time on the part of teachers and students. Consider the typical explicit instructional sequence used to help to achieve mastery (i.e., the degree to which students demonstrate the new skill correctly) of a new skill. Mastery is achieved by introducing and modeling a skill. Then students practice the skill with monitoring and assistance when needed by the teacher (i.e., guided practice). Finally, students practice the skill independently (Rosenshine, 2012). This three-phase explicit instruction sequence for achieving mastery is often referred to as "I do," "We do," and "You do."

Decisions about whether to add automaticity training to the explicit instructional sequence used to achieve mastery is not without consequences. For the remainder of this dissertation, I will use the term extended practice instead of the term automaticity training because it aligns more directly with the explicit instruction sequence. Providing personalized overlearning opportunities for the purpose of developing automaticity is best achieved through one-to-one practice. There is little question that this is impractical for classroom teachers. Therefore, an important question within the field is whether or not specific extended practice of fundamental literacy component skills is necessary and

effective at enhancing reading fluency and comprehension. In other words, what effects on reading performance would be achieved by adding another frequent and structured "You do" overlearning phase to the "I do," "We do," and "You do" three phase explicit instruction sequence used to achieve mastery of fundamental literacy component skills?

Purpose

The purpose of this review is to evaluate whether there is evidence of effects of extended practice on reading outcomes. To do this, I conducted a comprehensive and systematic literature review of the literature on extended practice.

Operational Definitions of Important Terms Related to the Studies

In the context of this literature, there are four operational definitions to consider. These operational definitions include:

- *automaticity training*—defined as extended practice of fundamental literacy component skills beyond mastery to a level of accurate and fast responses.
- *individual words*—defined as words drawn from a corpus of words (i.e., high frequency words, sight words).
- *contextually-based words*—defined as words drawn directly from selective a set of passage/s rather than from a corpus of words (i.e. high frequency words, sight words).
- *fundamental literacy components skills*—defined as individual elements (i.e., diagraphs, letter names, letter sounds, individual words) of reading skills. Common fundamental literacy component skills relevant by grade drawn from the National Common Core Standards include upper and lowercase letters and

high frequency words in kindergarten and grade-appropriate irregularly spelled words in grades 1-3 (Common Core State Standards Initiative (n.d.).

Literature Search Procedures

The following procedures were used to identify the studies covered in this literature review. The inclusion criteria and exclusion criteria are detailed first followed by the search procedures.

Studies eligible for inclusion met the following criteria:

1. The study used an experimental or quasi-experimental design. Note that the criteria did not eliminate consideration of single case design studies.
2. The study was conducted with students in Grades Kindergarten through 6.
3. The intervention addressed the effects of extended practice of letter names, letter sounds, and/or individual words on measures of reading fluency and/or reading comprehension. In the process of conducting the literature review, I expanded the operational definition of fundamental literacy component skills related to individual words. Given the limited number of studies that focused on the effects of extended practice of individual words that were part of the larger corpus (i.e., high frequency words) I expanded the operational definition to include contextually-based words because I thought such studies would provide additional information on the effects of extended practice of individual words on reading fluency and comprehension.
4. The study was published in English in a peer reviewed scholarly journal and/or a non-peer reviewed outlet (e.g., dissertations, reports).

Studies were excluded if:

5. The study failed to report statistics necessary to compute effect sizes.
6. Students received instruction of fundamental literacy component skills rather than extended practice.
7. Extended practice provided corrective feedback on individual items during practice. While feedback is not required for extended practice, if feedback was given, I looked closely at how it was given to ensure that the feedback was not guided practice. For example, I eliminated studies in which students received feedback during practice from another student (Hickman, 1978; Higgins & Raskind, 2004) or a computer/teacher (Allen, 1982; Archwamety & Samuels, 1973; Lewandowski, Begeny & Rogers, 2006; Martin-Chang & Levy, 2005; Samuels, Dahl, & Archwamety, 1974). While feedback after practice (number correct/incorrect) was an acceptable component of extended practice, feedback given during extended practice (e.g., immediate error correction) was considered guided practice.

A broad, initial search using the following four data bases: ERIC, ProQuest Dissertations and Theses, PsychINFO and PsychARTICLES yielded 1,479 articles. From this initial review, 1,426 studies clearly did not meet inclusion criteria. The remaining 53 studies were reviewed to determine whether they met the inclusion criteria. In addition, an ancestral search of the 53 obtained studies was conducted to identify other possible studies to be included. Specifically, a forward search using Google Scholar and a backward title search using the obtained articles' reference lists, identified 8 additional

studies. The full article for each of the 61 studies was reviewed to determine whether the studies met all the inclusion criteria; 52 were excluded. In total, 9 studies met the criteria for this review.

Overview of the Studies Identified and Article Review Procedures

A total of nine studies were identified that assessed the effects of extended practice of fundamental literacy component skills on reading fluency and comprehension. These studies were analyzed using the above operational definitions. I used a spreadsheet to track the following information from each of the studies:

- *Total number of students.*
- *Grade of students.*
- *Type of research design.* True experiment (randomize the subjects, classrooms, or teachers to the experimental conditions) or quasi-experimental research design.
- *Fundamental experimental contrast*. Experimental condition relative to business-as-usual and/or active control condition/s.
- *Type of student*. Struggling readers were identified as not performing at grade level with no identified disability. “Full range of ” included all students in a classroom or school, without regard to disability status.
- *Description of experimental condition procedures*. The extended practice procedures used for the experimental condition/s.

- *Outcomes.* Norm-referenced or researcher-created measures assessing fluency (e.g., oral reading passages measuring speed) or comprehension (e.g., answering questions, recall).

Before proceeding, I categorized the nine included studies into two major groups. The first category, (n = 4) focused on assessing the effects of extended practice on reading fluency and/or comprehension. The second category of studies, (n = 5) involved those that assessed the effects of setting specific criteria for student rates of response during extended practice. The results were organized around these two categories.

Results

Descriptions of each of the researcher-created measures of reading fluency and comprehension are presented in Table 1 located at the end of the "Results" section. The studies under the extended practice only and extended practice with setting specific response rates are described in the remainder of this section. Keep in mind the operational definitions of individual words and contextually-based words when reading the description of the nine studies below.

Extended Practice Only

Strother (1984) examined the effects of extended practice of individual word practice on reading fluency and comprehension. The fundamental experimental contrasts compared individual word practice relative to either an active control or business-as-usual. A total of 105 students in Grades 2 and 4 identified as struggling readers based on scores at or below the median on the Gates-MacGinitie Reading Test participated in the study. Students were assigned to an experimental condition, an active control condition

or a business-as-usual condition. The experimental condition used above-average readers as peer tutors and teacher assistants. Students practiced reading sheets of randomly ordered high frequency words presented in 10 rows with 10 words in each row (Durr, 1973; Fries, 1963) using a four-step training process. In Step 1, students chorally read aloud a sheet of individual words one time to be sure words were pronounced accurately. In Step 2, students were prompted to read individual words rapidly for 10 minutes while a tutor recorded errors. When students finished, the tutor pointed to the errors and prompted students to say the words, assisting when needed. In Step 3, students repeated the same process as Step 2 for 5 minutes. In Step 4, students were timed reading a sheet of individual words aloud for one minute; if students finished the entire sheet of words, they reread the sheet while tutors tracked errors and provided feedback when finished. Every fifth day of practice students read a sheet of individual words for one minute while tutors tracked errors. Students in the active control condition used same the four-step training process as the experimental condition practicing sentences selected from popular children's stories (e.g., *Frog and Toad Are Friends*, by Arnold Lobel; *Mr. Noisy*, by Roger Hargreaves) with grade appropriate average readability (high first grade and high third grade). Students in the business-as-usual condition received regular reading instruction.

The norm-reference measure used to assess both reading fluency and comprehension was the Gates-MacGinitie Reading Test. The results show no overall effect of extended practice of the fundamental literacy component skill individual words on reading outcomes -0.06, 95% *CI* [-0.27, 0.16]. Confidence in these findings is limited

because treatment fidelity was not assessed or documented for the experimental condition. For this reason, further research is necessary to determine if extended practice of individual words is effective.

In contrast to Strother (1984), the remaining three studies focused on assessing the effects of extended practice of contextually-based words on reading fluency and/or comprehension. Spring, Blunden and Gatheral (1981) examined the effects of contextually-based word practice on reading comprehension. The fundamental experimental contrast was contextually-based word practice relative to business-as-usual. A total of 48, 3rd grade students from an intact classroom reading at grade level participated in the study. Students were randomly assigned to an experimental condition (contextually-based word) or business-as-usual condition. Students in the experimental condition practiced reading aloud word lists of contextually-based words alternated across 6 trials with a minute rest between trials. Students in the business-as-usual condition were given the same baseline and comprehension assessment as students in the experimental condition but without contextually-based word practice.

The researcher-created dependent measure used to assess reading comprehension was a CLOZE assessment (see Table 1). There appears to be no effect of extended practice on reading comprehension -0.38, 95% *CI* [-0.95, 0.19]. This indicates that extended practice using contextually-based words has no effect on reading comprehension. Confidence in these findings is limited because treatment fidelity was not assessed or documented for the experimental condition.

Table 1

Description of Researcher-Created Measures

Study		General Description
*Comprehension Measures:		
	Dahl (1974)	1. Students prompted to read aloud a passage at 3rd grade reading level with the initial letter removed. No feedback was given during the reading. The score was the number of exact responses.
	Spring et al. (1981)	2. Students read aloud a passage with missing words and logically guessed the missing word. Students were encouraged to skip a word if they paused for 4 seconds. The score was the number of correct responses that were syntactically and semantically acceptable (lenient scoring).
	Fleisher et al. (1979)	3. Students read aloud a passage with the missing word deleted after every five words. While reading the passage, student responses were transcribed and reading errors were corrected; however, no corrections were provided for errors involving the deleted words. The score was the percent of correct answers (exact).
		4. Six comprehension questions about a passage were asked to students orally; students responded orally. The score was the total number of questions answered correctly. Questions were those where the answer was directly stated in the text (factual).
		5. Six comprehension questions about a passage were asked to students orally; students responded orally. The score was the total number of correct questions answered correctly. Questions required synthesizing the main idea or using prior knowledge (inferential).
		6. Students prompted to tell everything they could remember about the passage. Responses were scored using total idea units. Each retell was compared to the list of idea units generated from the passage. Credit was given for recall of an idea unit if all components of the particular idea were included, even if they were not recalled verbatim from the passage.
	Levy et al. (1997)	7. Four comprehension questions about a passage were asked to students orally; students responded orally. The score was the total number of correct questions answered correctly (general).
		8. Students prompted to retell everything they could remember about the passage. Scores were calculated by converting sentences of the passage into simple sentences. The simple sentences were scored as single propositions. The score was the number of correct ideas but the exact wording from the passage was not required.

Table 1 continues

Study	General Description
*Comprehension Measures: (cont'd)	
Tan & Nicholson (1997)	9. Eight explicit comprehension questions about a passage were asked to students orally; students responded orally. The score was the total number of reasonable answers (lenient scoring).
	10. Four implicit comprehension questions about a passage were asked to students orally; students responded orally. The score was the total number of reasonable answers (lenient scoring).
	11. Students prompted to retell a passage in own words (i.e., students prompted with standardized prompts to start recall process). Responses were scored using points; the score was the total number of general details remembered.
	12. Students prompted to retell a passage in own words (i.e., students prompted with standardized prompts to start recall process). Responses were scored using points; the score was the total number of specific details remembered (i.e.,1 point for one detail and 4 points for 6 or more details).
*Fluency Measures	
Fleisher et al. (1979)	13. A passage was read aloud by students. Errors and deletions were corrected. The score was the total time to read a passage (minute).
Levy et al. (1997)	14. Students prompted to read aloud a passage. Time was measured using a stopwatch. Timing began when the student read the first word and ended when the last word was read. Pronunciation errors were not corrected. The score was the total time to read the passage (seconds).
Tan & Nicholson (1997)	15. Students prompted to read aloud a passage embedded with target words. (i.e., students were prompted if they were unable to read a word). The score was total time to read the passage (minute).

Levy and colleagues (1997) conducted two experiments focusing on the effects of extended practice of contextually-based words on reading fluency and comprehension. In experiment 1, the focus was on extended practice of contextually-based words; whereas, experiment 2 was an extension of experiment 1 with contextually-based words practiced

to a faster criterion. Experiment 2 is described further under the heading "Extended Practice with Set Criterion Response Rates" below.

In experiment 1, Levy et al. (1997) assessed the effects of extended practice of contextually-based words on reading fluency and comprehension. The fundamental experimental contrast was contextually-based word practice relative to a within-subject control. A total of 28 students in Grade 4 with a standard score of 90 or below on the word identification subtest of the Wide Range Achievement Test, 3rd Edition (WRAT 3) participated in the study. Students were assigned to an experimental condition and a within-subject control condition. In the experimental condition, each student practiced reading aloud 72 contextually-based words 6 times a day for four days. Words were presented individually on a computer screen; if students did not say the word within 2 seconds, the computer removed the word from the screen and the researcher pronounced the word. Accuracy of each response was recorded. After contextually-based word practice, students read aloud two passages (with and without contextually-based words) three times each. Counterbalancing ensured that each story was read equally often in the experimental and control conditions.

The researcher-created dependent measures used to assess reading fluency were passages with and without embedded contextually-based words. Comprehension was assessed using oral responses to comprehension questions and passage retell (see Table 1 for a description of each measure). Results from experiment 1 indicated that students in the experimental condition showed higher fluency rates relative to the control condition 0.63, 95% *CI* [0.10, 1.17]. There appears to be no effect on passage retell -0.24, 95% *CI*

[-0.76, 0.29] or reading comprehension -0.10, 95% *CI* [-0.63, 0.42]. This indicates that providing extended practice of contextually-based words has a positive effect on reading fluency but not on comprehension. Confidence in these findings is enhanced given that computer practice provided built in fidelity.

In an effort to better understand the best way to practice contextually-based words, Tan and Nicholson (1997) examined the differential effects of two types of contextually-based word practice conditions; words practiced in isolation versus words embedded within phrases on reading fluency and comprehension. The fundamental experimental contrasts involved comparing each of the two types of contextually-based practice to one another as well as active control. A total of 42 students in Grades 2-5 identified as below average readers based on graded passage and reading test scores (Department of Education, 1983) participated in the study. Students were randomly assigned to one of two experimental conditions. Students in the contextually-based word extended practice condition used a two-step training process. In Step 1, students read aloud contextually-based words on flashcards. If the word could not be pronounced it was presented in a two-word phrase and/or the student was prompted to sound out the word. Students read these words aloud until they could recognize each word within 1 second. In Step 2, students read a list of contextually-based words to a criterion rate of 90 words per minute (or less) with 95% accuracy. If this criterion was not met, students trained with a different word list until the criterion was reached or until training ended, whichever occurred first. As a result, not every student reached this criterion. Students in the phrase condition also used a two-step training process: In Step 1, students read aloud phrases

containing a contextually-based word. Phrases were designed to show the meaning of the word; only the contextually-based words embedded within phrases were drawn directly from passages. Students read aloud the phrases with the goal of achieving a criterion rate of 90 words per minute. In Step 2, students were timed reading aloud a randomly ordered list of contextually-based words; errors were recorded. Students assigned the active control condition heard contextually-based words read aloud and were asked questions about each word, (i.e., "What does lemonade mean to you?", "Can you use lemonade in a sentence?") Then students were timed reading aloud a randomly ordered list of words one time while errors were recorded.

The researcher-created dependent measure used to assess fluency was a passage embedded with contextually-based words. Comprehension was assessed using explicit and implicit comprehension questions and passage retell (see Table 1 for a description of each measure). The results indicated that students in both experimental conditions (contextually-based word and phrase) showed no difference in fluency rates compared to the active control condition 0.25, 95% *CI* [-0.49, 0.99] and 0.51, 95% *CI* [-0.24, 1.26] respectively. However, students in the experimental conditions (contextually-based word and phrase) showed higher comprehension rates on explicit 4.49, 95% *CI* [3.06, 5.91] and 5.25, 95% *CI* [3.64, 6.85] and implicit questions 2.36, 95% *CI* [1.38, 3.34] and 3.24, 95% *CI* [2.09, 4.39] compared to the active control condition. Furthermore, both experimental conditions showed higher general retell scores 1.62, 95% *CI* [0.76, 2.48], 1.60, 95% *CI* [0.74, 2.45] and detailed retell scores 1.25, 95% *CI* [0.44, 2.07] and 1.36, 95% *CI* [0.53, 2.18] compared to the control condition. The results indicated that extensive practice of

contextually-based word and phrases have positive effects on reading comprehension but not on reading fluency. Confidence in these findings are limited because treatment fidelity was not assessed or documented for either of the training conditions.

Extended Practice with Set Criterion Response Rates

Dahl (1974) assessed the effects of extended practice of individual words with a specific response rate on reading comprehension. The fundamental experimental contrast was individual word practice relative to business-as-usual. A total of 32 students in Grade 2 identified as poor readers from a regular reading program participated in the study. Students were randomly assigned to 1 of 8 conditions. Only 1 of the 7 experimental conditions (the remaining one served as a business-as-usual control condition) directly assessed the effects of extended practice of individual words with a specific response rates on reading comprehension. Words were selected from a reading series and a common word list (Dale, 1931). Following mastery training on individual words with a 2.5 second criterion rate of response, students in the experimental condition responded to progressively shorter criterion rates on individual words (i.e., 2 sec., 1.5 sec., 1 sec.) Students in the business-as-usual condition received basic reading instruction.

The researcher-created dependent measure used to assess reading comprehension was a CLOZE assessment (see Table 1). The results indicated that students in the experimental condition showed no difference on reading comprehension scores relative to those in the business-as-usual condition 0.72, 95% CI [-0.73, 2.16]. This indicates that individual word practice with faster response rates had no effect on reading

comprehension. Confidence in these findings is limited because treatment fidelity was not assessed or documented for the experimental condition.

In contrast to set criterion response rates, Hudson et al. (2011) examined the effects of individual word extended practice with feedback designed to encourage students to increase response rates on reading fluency and comprehension. The fundamental experimental contrast was individual word practice relative to active control. A total of 56 students from a Grade 2 intact classroom identified by teachers as struggling readers were screened using DIBELS Oral Reading Fluency (ORF) and the Picture Vocabulary subtest of the Woodcock Johnson Test of Academic Achievement, III. Students with a DIBELS ORF median score at or below the 35th percentile and a vocabulary measure score at or above the 45th percentile participated in the study. Students were randomly assigned to an experimental condition (automaticity + accuracy) or active control condition (accuracy) condition. Each condition received the same mastery instruction procedures; however, the conditions differed in the type of feedback they received and in the type of responses students graphed. Students in the experimental condition practiced letter sounds and individual words using a three-step process. In Step 1, students blended and segmented words ranging from two-five phonemes (Blachman, Ball, Black & Tangel, 2000). In Step 2, students practiced a page of isolated letter sounds. In Step 3, students repeated the same Step 2 activities with a page of high frequency words. Students received feedback and graphed their rate of accuracy and rate of response. Students in the active control condition received the same three-step mastery training process; however, students only graphed accuracy rates.

The dependent measure used to assess reading fluency was the DIBELS Oral Reading Fluency Assessment (ORF). Reading comprehension was assessed using the Picture Vocabulary subtest of the Woodcock Johnson Test of Academic Achievement, III. The results indicated that students in the experimental condition showed no difference in fluency rates relative to the active control condition 0.24, 95% *CI* [-0.28, 0.77]. In addition, there appears to be no effect on reading comprehension -0.48, 95% *CI* [-1.01, 0.05]. This indicates that providing students extended practice of individual words with a controlled rate of response appears to have no effect on either reading fluency or reading comprehension. Confidence in these findings is enhanced given that researchers assessed and documented treatment fidelity of the experimental condition.

The remaining studies focused on assessing the effects of criterion response rates of contextually-based words on reading fluency and/or comprehension. In the second of two experiments (previously described), Levy and colleagues (1997) assessed the effects of setting criterion rates of contextually-based words on reading fluency and comprehension. The fundamental experimental contrast was a set criterion response rate relative to an untrained within subject control. A total of 40 students in Grade 4 identified as struggling readers participated in the study. Students with a scores of 90 or less on the word identification subtest of the WRAT 3 were placed into two groups based on RAN scores (rapid automatized naming speeds) which categorizes fast responders from slow responders. All students (fast RAN and slow RAN responders) were assigned to an experimental and a within-subject control condition. In the experimental condition, students practiced 90 contextually-based words five times per day. Each word was

presented on a computer screen for 1.5 seconds and accuracy of the responses were recorded. After contextually-based word practice, students read aloud two passages (with and without contextually-based words) four times each. Counterbalancing ensured that each story was read equally often in the experimental and control condition.

The researcher-created dependent measure used to assess reading fluency were passages with and without contextually-based words. Comprehension was assessed using questions revised to fit the passage versions (see Table 1 for a description of each measure). The results indicated that students in the experimental conditions with fast RAN students and slow RAN students both showed no difference in fluency rates relative to the control conditions 0.16, 95% *CI* [-0.46, 0.78], 0.30, 95% *CI* [-0.32, 0.93] respectively. In addition, students in the fast RAN and slow RAN experimental conditions showed no difference in comprehension rates relative to the control conditions 0.34, 95% *CI* [-0.28, 0.97], 0.16, 95% *CI* [-0.46, 0.78] respectively. Results indicated that extended practice of contextually-based words with shorter criterion response rates has no effect on student fluency and comprehension scores. Confidence in these findings is enhanced given that computer practice provided built in fidelity.

Fleisher, Jenkins, and Pany (1979) conducted two studies to assess the effects of extended practice of criterion response rates of contextually-based word on reading fluency and comprehension using two experiments; both are described below. In experiment 1, the fundamental experimental contrast was a set criterion response rate relative to a within subject unspecified response rate. A total of 36 students in Grades 4 and 5 identified as struggling readers with scores below the 40th percentile on the

Metropolitan Achievement Test reading subtest (1970) participated in the study. Students were assigned to an experimental condition and a within-subject control condition. Both the experimental and control conditions practiced reading aloud lists of contextually-based words counterbalanced for order and practice conditions. Students in the experimental condition participated in a two-step training process. In Step 1, students practiced contextually-based words in a flashcard drill format until they could recognize each word within one second. In Step 2, students read aloud a list of contextually-based words in random order. Students were required to read words accurately at a rate of 90 words per minute or less. If this criterion was not met, students were given additional practice on the contextually-based words in flashcards and lists. General errors or more than two suffix errors resulted in recycling through the practice task. Students in the control condition were prompted to read the list of contextually-based words quickly and accurately without the two-step training sequence.

The researcher-created dependent measure used to assess fluency were passages embedded with contextually-based words. Comprehension was assessed using a CLOZE assessment and comprehension questions (see Table 1 for a description of each measure). Results indicated that students in the experimental condition showed higher fluency rates relative to the control condition 1.21, 95% *CI* [0.40, 2.02]. For comprehension, there was no effect when students answered inferential comprehension questions 0.22, 95% *CI* [-0.52, 0.96]; furthermore, there appears to be no effect on reading comprehension using either the CLOZE measure -0.37, 95% *CI* [-1.11, 0.38] or factual comprehension questions -0.08 95% *CI* [-0.82, 0.66]. This indicates that extended practice of

contextually-based words to a specific criterion must be explored further. Confidence in these findings is limited because treatment fidelity was not assessed or documented for the experimental condition.

Building on this work, in experiment 2, Fleisher and colleagues (1979) assessed the differential effects of set criterion rates with two types of extended practice of contextually-based words (words practiced in isolation versus words embedded within phrases) on reading fluency and comprehension. The fundamental experimental contrast was set criterion response rate of individual contextually-based words practiced in isolation or embedded within phrases and no training control condition. A total of 33 students in Grades 4 and 5 identified as struggling readers were screened using the MAT achievement test and a screening passage designed for the experiment. Students reading at least one year below grade level, reading below 60 words per minute on the word list corresponding with a screening passage and a score below 65% on a CLOZE test participated in the study. Students were randomly assigned to an experimental condition (contextually-based word) or three active control conditions (phrase, poor reader or good reader). Only the experimental condition compared to the phrase active control condition and poor reader active control condition, directly assessed the effects of practice to a stringent criterion on fluency and comprehension. Students in the experimental condition practiced contextually-based words using the same two-step training process from Experiment 1 with a stringent criterion to terminate practice. After the flash card drill, students read a list of contextually-based words aloud until they achieved the criterion rate of 95 words per minute. In Step 2, students read a second word list. If students failed

to achieve the criterion rate, they practiced until they succeeded. Students continued this sequence until they were able to read two consecutive contextually-based word lists at this criterion rate without specific practice on the list. Students in the phrase active control condition also completed a two-step process. In Step 1, students practiced contextually-based phrases until they could read them at a rate of 160 words per minute with no errors. In Step 2, students read a second list of phrases. If students failed to achieve the criterion rate they practiced until they succeeded. Students continued this sequence until they read two consecutive phrase lists at the criterion rate without specific practice on the phrases. Students in the poor reader active control condition did not receive training of words that appeared in the passages.

The researcher-created dependent measure used to assess fluency were passages embedded with contextually-based words. Comprehension was assessed using a CLOZE assessment, comprehension questions and passage retell (see Table 1 for a description of each measure). The overall results indicate no apparent effect of extended practice of contextually-based words to a stringent criterion on reading outcomes, 0.16, 95% *CI* [-0.12, 0.44]. Confidence in these findings is limited because treatment fidelity was not assessed or documented for the experimental condition. For this reason, further research is necessary to determine if extended practice of contextually- based words drawn directly from passages to a stringent criterion is effective.

Summary of the Results

It appears that only nine studies have been conducted that assess the effects of extended practice of fundamental literacy component skills on reading fluency and/or

comprehension. When reviewing these nine studies, I initially believed the relevant issue was the grade of the students completing extended practice, considering that over half the studies that provided extended practice of fundamental literacy component skills used students in Grades 3-6 (Fleisher et al., 1979; Levy et al., 1997; Spring et al., 1981; Tan & Nicholson, 1997). Furthermore, rereading the K-3 Common Core Literacy standards, instruction of fundamental literacy component skills (i.e., letter names, letter sounds, individual words) are part of state and national learning standards for kindergarten; consequently, my initial argument for this dissertation study was that extended practice of fundamental literacy component skills may be more beneficial for students in the earlier elementary grades (e.g., K-2nd) when extended practice would potentially have the greatest impact. However, after reviewing the fundamental experimental contrasts for the nine studies, two major issues relating to this dissertation study became clear. First, there is an immense research gap on extended practice of fundamental literacy component skills overall. A total of nine studies included in the literature review assessed the effects of extended practice of fundamental literacy component skills; there simply are not enough relevant studies in this specific area.

A second issue is that we do not know enough about the effects of extended practice of fundamental literacy component skills. Only three of the nine studies assessed the effects of extended practice of the fundamental literacy component skill individual words on reading outcomes (Dahl, 1974; Hudson et al., 2011; Strother, 1984). The remaining studies provided extended practice of contextually-based words; that is, words when automatized, can be applied to specific passages but are not considered a

fundamental literacy component skill. There is a lack of pertinent studies examining the effects of extended practice of fundamental literacy component skills (i.e., letter names, letter sounds, individual words).

Current Study

As previously mentioned, there is a need for more research on the effects of extended practice of fundamental literacy component skills; there simply is a lack of studies in this specific area. This dissertation study will expand on what little research has been done on the effects of extended practice of letter names. Furthermore, this study will match extended practice of a fundamental literacy component skill with children at the appropriate age/grade level; preschool children will receive extended practice of letter names which will potentially have the greatest academic impact later.

Statement of the Problem

It appears that the nine studies assessing the effects of extended practice of fundamental literacy component skills has been limited to individual words. Furthermore, only three of the nine studies reviewed, assessed the effects of extended practice of the fundamental literacy component skill, individual words, part of the larger corpus of words. The problem then is that little is known about the effects of extended practice of fundamental literacy component skills on reading outcomes with young children.

Purpose

The purpose of this dissertation is to assess the additive effect (beyond mastery instruction) of extended practice of letter names on the pre-literacy performance of preschool children. Originally, there were two guiding research questions for this

dissertation study (see below). However, due to the short measurement period as a result of the Covid-19 pandemic, the second research question was dropped.

> What are the effects of extended practice on the number of letter names (from each Block of letters) that children can identify correctly in one-minute?
>
> What are the effects of extended practice on the overall growth in the number of letter names children can identify correctly on the standardized DIBELS LNF measure?

The guiding question for this dissertation study is:

> What are the effects of extended practice on the number of letter names (from each Block of letters) that children can identify correctly in one-minute?

Chapter Three

Method

Study Overview

The Covid-19 pandemic affected this study in three major ways. The first effect of Covid-19 pandemic was on the (B) Extended Practice condition when children were expected to complete extended practice of letter names from different Blocks over three consecutive sessions immediately following mastery instruction. Instead, each child experienced a one-month time delay at different times during the extended practice intervention. Jason, who spent the least amount of time in the (A) Baseline condition, completed two extended practice sessions at school immediately after mastery instruction followed by one extended practice session from home, one-month later. Dwayne, who spent two sessions at Baseline, completed one extended practice session at school immediately after mastery instruction and then completed two extended practice sessions from home, one-month later. Hudson, who spent the most time at Baseline, completed three consecutive extended practice sessions at home after a one-month delay following mastery instruction. She also did not achieve mastery of one Block of letter names. Clearly, this indicates that the extended practice intervention was not implemented as intended.

As a result of the one-month time delay, the Covid-19 pandemic also affected the timing of assessments. In the (C) Outcome Assessment condition, the outcome assessments for Jason and Dwayne was delayed a month following extended practice on

Blocks 1-3 letter names, respectively. Hudson did not experience an assessment delay in the (C) Outcome Assessment condition immediately following extended practice.

Finally, the Covid-19 pandemic affected the data collection procedures used during the (A) Baseline and (C) Outcome Assessment conditions. Specifically, the measures were administered differently across these conditions. During the (A) Baseline condition, the measures were administered to each child by the research-assistant, individually at school. Whereas, during the (C) Outcome Assessment condition the measures were administered to each child at home by a parent and scored concurrently by the research-assistant and researcher using the video conferencing tool, Zoom. In addition, the change in procedures required one practice session during the (C) Outcome Assessment condition to ensure children understood the adjusted assessment procedures.

Setting and Participants

The COVID-19 pandemic required the study to be conducted in two distinct settings. Initially the study began at a parochial school serving students in preschool through eighth grade located in a medium sized city in Nebraska. Mastery instruction and some experimental sessions were conducted in several places throughout the school including the school's meeting room and, on occasion, a small office next to the principal's office. Following school closure due to the COVID-19 pandemic, the study was completed at each child participant's home. Experimental sessions were completed remotely using Zoom, the remote conferencing service.

Participants included three, typically developing, pre-Kindergarten children enrolled in preschool. Child participants were selected to participate in the study by

nomination of their teacher. The researcher requested that the preschool teacher nominate three children in her classroom with little to no knowledge of letter names whom she believed would benefit from letter name instruction and practice. Parent consent was obtained for each of the child participants. Once parent consent was obtained, the researcher assessed each child's knowledge of letter names. The number of letter names each child could correctly identify was used for informational purposes only and did not influence which letter names were taught to mastery. Each child was taught Blocks of letter names by the researcher using the same instructional sequence.

Pseudonyms were assigned to each of the three child participants; (i.e., 2 male and 1 female). Before letter name instruction to mastery began, Jason, male, correctly identified a small number of letter names (M = 4.33; SD = 3.22). Dwayne, male, correctly identified some upper and lower-case letter names (M = 9; SD = 2) and Hudson, female, identified a small number of letter names (M = 3; SD = 1).

Letter Name Organization

Prior to the start of the study and during experimental study conditions, each of the child participants learned and practiced and were assessed on 41 letter names. These 41 letter names, specified by Carnine, Silbert, Kamé ennui and Tarver (1997) represented upper and lowercase letters with unique shapes (see Figure 1).

Figure 1

Letter Names Taught and Sequence

a, m, t, s, i, f, d, r, o, g, l, h, u, q, L, M, F, c, b, n, k, v, e, w, j, p, y, T, J, Q, D, I, N, A, R, E, H, G,B, x, z

In addition, these 41 letter names were organized into 3 Blocks based on the frequency in which the letter names occur in print; letters with somewhat similar shapes (e.g., b, d, p, q) were kept distinct from one another (see Table 2). Based on this organizational structure, the Blocks were unequal in number (i.e., Blocks 1 and 2 each totaled 14 letter names and Block 3 had 13 total letter names) and in difficulty level.

Letter Name Instruction and Extended Practice Materials

Before the study began, each child completed letter name instruction to mastery with structured lessons developed by the researcher. The 3 Blocks of 41 letter names taught to mastery aligned directly with the 3 Blocks of letter names each of the child participants practiced during the extended practice intervention. The materials for instruction and extended practice are each described in detail below.

Table 2

Letter Name Blocks

Block 1	Block 2	Block 3
a	L	J
m	M	Q
t	F	D
s	c	I
i	b	N
f	n	A
d	k	R
r	v	E
o	e	H
g	w	G
l	j	B
h	p	x
u	y	z
q	T	

Letter Name Instruction Materials

A set of five lessons was used to teach letter names to mastery for Blocks 1-3. Across each of the Blocks, all lessons included four instructional activities: letter name review, letter name instruction, letter name practice and letter name writing (see Appendix D). Lesson 1 introduced the first two letters in a given Block. Lessons 2-4, each began with a review of the letter names taught in the previous lesson. For example,

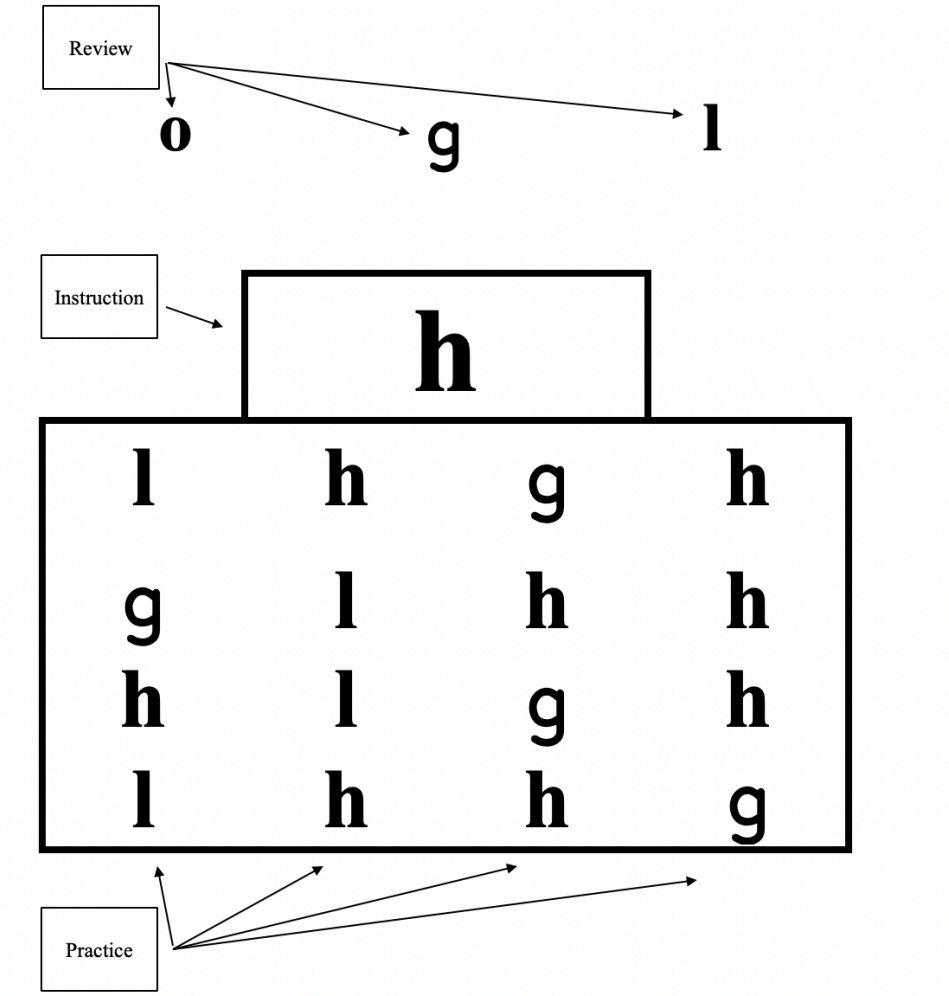
Lesson 2 began with a review of letters taught in Lesson 1 and Lesson 3 began with a review of the letters taught in Lesson 2 and so on. Following the letter name review, one letter was introduced and taught at a time. Lesson 5 was a cumulative review of all the letter names taught in a particular Block. The four instructional actives are each described below:

Letter Name Review (Lessons 2-4). In letter name review, the letter names taught in the previous lesson were displayed at the top of the lesson page in a single row. The child was asked to point at and name each of the letters.

Letter Name Instruction (Lessons 1-4). The letter name(s) taught were bolded, enlarged (i.e., 70-point font) and presented in a distinct box at the top of Lesson 1 immediately following the review in Lessons 2-4. A model-lead-test sequence was used to teach the new letter name. Once the child correctly identified the letter name, he/she was asked to discriminate the letter name in the context of the two letter names most recently taught. These letters were presented in a smaller sized font a total of eight times across four rows whereas the two most recently taught letter names were presented four times across four rows. Each row contained 4 letter names that consisted of the new letter name and two recently taught letter names. In each row, the new letter name was presented twice whereas the two most recently taught letter names were each presented once. Careful attention was paid by the researcher so that the three letter names (i.e., new and recently taught) were presented no more than two consecutive times in each row with no identifiable pattern throughout the four rows (see Figure 2).

Figure 2

Letter Name Example Lesson



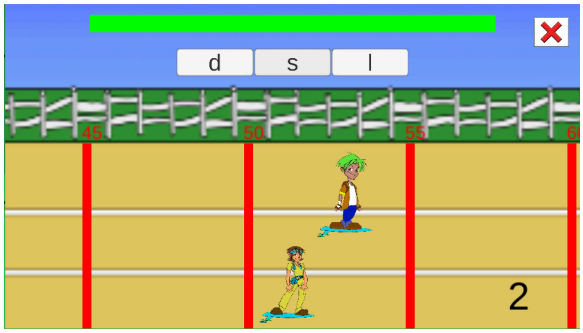
Letter Name Writing (Lessons 1-4). The letter name(s) taught during instruction were written on lined paper created by the researcher. The lined paper, created with young children writers in mind, employed lines wide and long enough for the child to write the new letter(s) three consecutive times) (see Appendix D for Block 1-3 lessons).

Extended Practice Materials

Extended practice of letter names was completed using the computerized program *First Steps to Reading Fluency* (*FSRF*) (Erudite Digital Learning Lab, n.d.) In *FSRF,* children practiced letter names in a Block (i.e., Block 1-3) using an externally based competition game called the "**Running Game**" in which children tried to beat their opponent (see Figure 3).

Figure 3

"Running Game" Response Format for Letter Names



In the "**Running Game**", the child's character raced an opponent for one-minute-practice sessions. The speed of the opponent was based on the child's fluency goal set at the start of the game. A letter name from the designated Block was dictated orally while the correct letter name and two distractor letter names from the same Block were simultaneously presented in row at the top of the screen. If the child pressed the correct letter name, the child's character ran faster and pressing the incorrect letter name and/or pausing, slowed down the child's character. Children won the "**Running Game**" if they reached or exceeded their fluency goal. The child's fluency and accuracy data were

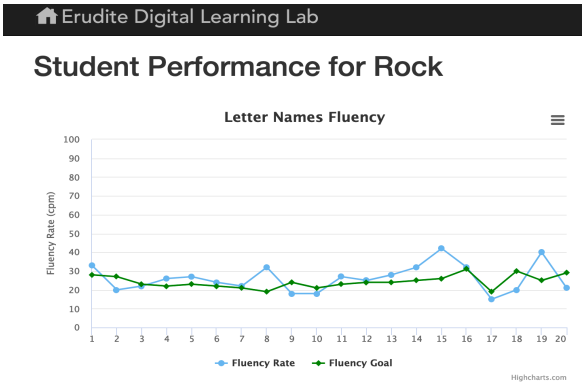
monitored throughout the practice session. At the end of the practice session, a feedback screen appeared that reported the child's fluency and accuracy data using a color-coded format (e.g., green, yellow, red). In addition, a line graph tracked the child's fluency performance over time (see Figures 4 and 5).

Figure 4

Color Coded Format for Feedback

Figure 5

Line Graph



Study Design

A multiple baseline design across child participants was used to assess the effects of extended practice of letter names on the rate of correctly identified letter names per minute specific to each of the Blocks (i.e., Blocks 1-3). Each of the three preschool children were exposed to three experimental conditions: (A) Baseline, (B) Extended Practice (i.e., (B1) Extended Practice and (B2) Extended Practice) and (C) Outcome Assessment.

(A) Baseline

The (A) Baseline condition covered one, two or three consecutive sessions. For each session, children were administered Fluency CBM Block 1-3 researcher-created measures (see Table 4). All the measures in this condition were administered by the research-assistant at school. Each child was read scripted directions; children began the measure when prompted by the word “Begin” and ended the measure when prompted with the word “Stop”. All measures were scored by the research-assistant and researcher concurrently. The score obtained by the research-assistant was recorded as the final score. Once the final score was obtained for each of the Fluency CBM Blocks 1-3 measures, the researcher entered these scores into an excel spreadsheet (i.e., each data point represented a Block). Data points were entered into a spreadsheet sequentially based on the order in which Blocks were assessed.

(B) Extended Practice

The (B) Extended Practice condition was intended to occur over three consecutive sessions at school. Due to the Covid-19 pandemic, this condition was broken into two sub

conditions: (B1) Extended Practice at school; (B2) Extended Practice at home (following a one-month delay due to the COVID-19 pandemic). As outlined above, each child experienced extended practice differently (see Table 3 below). Specifically, Jason completed two consecutive sessions of (B1) Extended Practice at school with the researcher before the school closed and resumed one session of (B2) Extended Practice at home with a parent after a one-month time delay. Dwayne completed one session of (B1) Extended Practice at school with the researcher before the school closed and resumed two sessions of (B2) Extended Practice at home with a parent after a one-month time delay. Hudson experienced a one-month time delay before she completed three consecutive sessions of (B2) Extended Practice at home with a parent.

Table 3

Extended Practice Across Extended Practice Subcategories and Sessions

Child	(B) Extended Practice Condition			
Jason	B1	B1	*	B2
Dwayne	B1	*	B2	B2
Hudson	*	B2	B2	B2

Note. B1 = extended practice session at school with researcher; B2 = extended practice session at home with parent ; * = one-month time delay

For each extended practice session, all children practiced three Blocks of letter names (i.e., Blocks 1-3) in a different order; each of the three Blocks were counterbalanced across children and Blocks (see Table 4). In addition, each session

Table 4

Blocks Measured Across Children and Conditions using Researcher-Created CBM Measure

	Sequence Blocks were Measured								
Child	Baseline	Extended Practice			Outcome Assessment				
1	1(11)	1	2	3	1(12)		2(15)		
	2(2)	2	3	1	2(14)		3(7)		
	3(1)	3	1	2	3(6)		1(3)		
2	2(7)	3(12)	2	3	1	2(2)		3(14)	
	3(3)	1(1)	3	1	2	3(7)		1(3)	
	1(6)	2(1)	1	2	3	1(10)		2(4)	
3	3(8)	1(3)	2(8)	3	1	2	3(1)		1(11)
	1(13)	2(14)	3(7)	1	2	3	1(6)		2(4)
	2(2)	3(6)	1(10)	2	3	1	2(6)		3(15)
Sessions	1	2	3	4	5	6	7	8	9

Note. Blocks were counterbalanced across children. Numbers in parentheses indicate random assignment of measure form used.

involved extended practice of each of the three Blocks of letter names for four consecutive, one-minute practice sessions (i.e., 12 total minutes of extended practice each session).

(C) Outcome Assessment

The (C) Outcome Assessment condition covered two non-consecutive sessions one day apart. For each session, children were administered the Fluency CBM Block 1-3 researcher-created measures (see Table 4). All measures in this condition were intended to be administered at school by the research-assistant. Furthermore, all measures were intended to be administered after the three children completed three consecutive extended practice sessions. As noted above, the assessment procedures varied (see table or section above). The differences in the scoring procedures are described below in the "Measures" section.

Instruction and Extended Practice Procedures

The Covid-19 coronavirus pandemic did not affect letter name instruction prior to the start of the study but it did impact the (B) Extended Practice condition procedures for all children in the study. Due to the pandemic, each child experienced three sessions of extended practice with a one-month time delay before or during the extended practice sessions. This time delay represented the time between school closure and when the researcher obtained permission from IRB to continue the study remotely.

Consequently, each child experienced a one-month time delay before all extended practice occurred or during the extended practice sessions. As a result, some children completed extended practice sessions at school with the researcher and at home with a

parent (e.g., Jason, Dwayne). One child completed all extended practice at home with a parent (e.g., Hudson). The instructional procedures and extended practice procedures are each described below.

Letter Name Instruction Procedures

In order to achieve mastery of letter names the researcher taught each child letter names individually for two instructional sessions each day on the designated days children attended preschool (i.e., one morning instructional session and one afternoon instructional session). Instruction was completed in sequential order starting with Block 1 and ending with Block 3. In each instructional session, the researcher taught the child three to four letter names from a particular Block. Lesson 1 for each Block introduced two letters at a time to allow children to discriminate between two letters. All subsequent lessons introduced one letter at a time. A cumulative review for each Block was delivered after the 4th instructional session when the Block was completed (see Appendix D).

A four-step instructional sequence of activities was used within each lesson to teach each letter name(s) to mastery. This instructional sequence designed to achieve mastery was repeated for each letter name(s) taught within a lesson. Thus, the instructional sequence was repeated three to four times within each lesson.

Immediate Review of Letter Names. Children practiced discriminating letter names taught and practiced in the most recent lesson. Children spoke the letter names presented in random order within a left-to-right format. An error correction procedure was used when a child said an incorrect letter name or was unable to discriminate a letter

name. This involved stopping the child immediately and reteaching the letter name using the same explicit instruction procedures used to teach children to identify letter names.

Instruction of Letter Name(s). Explicit instruction procedures were used to teach children to discriminate letter names: Model, guided practice, independent practice otherwise known as “I do”, “We do”, “You do.” The letter name(s) was first modeled by the researcher, the child then said the letter name in unison with the researcher, and then the child said the letter name independently. These explicit instruction procedures were repeated if necessary.

Practice of Letter Names. Children practiced discriminating letter names. Children said the letter names presented in random order within a left-to-right grid format. An error correction procedure was used when the child said an incorrect letter name or was unable to discriminate a letter name. This involved stopping the child immediately and reteaching the letter name with the explicit instruction procedures used to teach children to discriminate letter names. Children completed practice of the letter name(s) for five consecutive sessions before the next letter was taught.

Writing of Letter Names. Children wrote the letter names taught. Children were asked to write the letter names without support (i.e., writing independently without letter tracing).

In the session following instruction of all the letters in a Block, the child completed a cumulative review of all the letter names within that Block. The letters were presented in random order within a left-to-right grid format. The child said each letter name; an error correction procedure was used when an incorrect letter name was provided or when

the child was unable to identify a letter name. This involved stopping the child immediately and reteaching the letter name using the explicit instruction procedures originally used to teach children to discriminate letter names. Children completed practice of the letter name cumulative review for two consecutive sessions.

Mastery for each Block was established when the child correctly named all letters within a particular Block and scored 100% on the Mastery CBM measure (Blocks 1-3). The child had as much time as needed to name each of the letters. The child's accuracy score on the Mastery CBM measure was determined by the total number of correctly stated letters within a Block. The length of time necessary for each child to achieve letter name mastery across each of the Blocks varied given that each child had to demonstrate mastery of each Block prior to starting (A) Baseline condition (see Table 5 in the "Measures" section below).

Extended Practice Procedures

A computerized program First Steps to Reading Fluency (*FSRF)* was used for extended practice of letter names. (*FSRF)* was accessible via the website https://eruditelearninglab.unl.edu/Live/; this website was accessible by any major desktop browser (e.g., Microsoft Edge, Google Chrome, Firefox) that supported WebGL2.0. Extended practice was intended to be delivered over three consecutive school sessions and supervised by the researcher. Instead, each child experienced three extended practice sessions differently. Jason, completed two, consecutive sessions of (B1) Extended Practice at school with the researcher. After a one-month passed, Jason completed one (B2) Extended Practice session at home with a parent. Dwayne completed one session of

(B1) Extended Practice at school with the researcher. After a one-month passed, Dwayne completed the remaining two consecutive sessions of (B2) Extended Practice at home with a parent. Hudson experienced one-month delay between the (A) Baseline and (B) Extended Practice conditions. Consequently, she completed all three consecutive sessions of (B2) Extended Practice at home with a parent. Extended practice consisted of repeated practice of upper and lowercase letter names from each of the three Blocks. Each child completed extended practiced for the Blocks in a counterbalanced fashion (see Table 4).

Children used the "**Running Game"** for extended practice of letter-names. In this game, children completed extended practice where three letters were presented on a computer or Mircrosoft® Surface Pro (i.e., the correct letter name and two distractor letter names). The letter names included within each of the Blocks were presented randomly and had an equal probability of being presented. The distractors were randomly selected from the letters within a Block. Thus, the child was asked to discriminate a correct response among two distractors from the same letters within a Block. Pressing the correct letter name was scored as correct while pressing one of the distractors was scored as incorrect.

In the "**Running Game**", children raced against an opponent whose speed was based on the fluency goal chosen by the child at the start of the game. The child's character moved faster when the correct letter names were identified and slowed down when incorrect letter names were identified. Long pauses identifying a letter name also slowed the character. Children beat their opponent by reaching or exceeding their fluency goal.

Before each one-minute practice session, children choose among four progressive fluency goals. An adaptive learning algorithm based on their previous performance was used to establish the four goals for the extended practice session. Fluency goals, including the highest goal, were set at a level that allowed children to practice the letter names at a comfortable rate.

At the end of each one-minute practice of letter names, the researcher and child or parent and child reviewed a feedback screen that displayed the child's fluency rate correct per minute, accuracy rate, number correct, and number incorrect. The researcher or parent used color-coding to discuss the child's rate and accuracy rate during each one-minute practice session. The color-coding scheme for fluency rate and accuracy included the colors green, yellow and red. For fluency rate, green indicated the child met or exceeded their fluency goal for the session, yellow indicated the child was close to their fluency goal (within 90-99% of their chosen goal, but within the original range of the four progressive goals), and red indicated that child was less than 90% below their fluency goal. For accuracy, green indicated correct responding equal to or greater than 94%, yellow indicated correct responding between 90 to 93%, and red indicated correct responding less than 90%. Additionally, incorrect responses were shown at the bottom of the screen using interactive tiles (i.e., tapping a tile allowed the child to replay letter names).

At the end of each extended practice session, the researcher or parent and child viewed a graph that displayed the child's rate of correct responses. The graph contrasted the rate of correct responses with the child's chosen fluency goal for each practice

session. Together, the researcher or parent and child visually compared the two lines and data points to confirm if the child achieved and/or exceeded their fluency goal.

Measures

Prior to the start of the study, three researcher-created measures (i.e., Mastery CBM Blocks 1-3) were developed to establish mastery of letter names within a specific Block. During the study, three researcher-created measures (i.e., Fluency CBM Blocks 1-3) were used to assess the rate at which each child correctly identified letter names within each of the corresponding Blocks. All of the researcher-created measures are described in detail below.

Mastery CBM Blocks 1-3 Measures

Mastery CBM Blocks 1-3 were individually administered, researcher-created mastery measures. Letter name mastery was established when a child identified all of the letters in a Block correctly on the Mastery CBM Blocks 1-3 measures (i.e., a score of 100%). For the Mastery CBM Blocks 1-3 measures, children were presented with a page of upper and lowercase letters drawn only from each of the three Blocks. Letters were randomly arranged in a column format. One form was created for each Block. Children were given as much time as they needed to name each of the letters. If a child did not know a letter (e.g., 3-5 seconds pause), the researcher provided the name of the letter. Any independent self-corrections were counted as correct. The child's score was the total number of letters named correctly (see Appendix B).

Fluency CBM Blocks 1-3 Measures

Fluency CBM Blocks 1-3 were individually administered, researcher-created CBM measures. The fluency rate of correctly identified letter names was defined as the number of letter names from each of the three Blocks a child correctly said in one-minute on the researcher-created Fluency CBM Blocks 1-3 measures. Each of the Fluency CBM Blocks 1-3 measures consisted of a page of 110 letters names from the specific Block displayed in a grid format. Fifteen alternate forms were created; one measure from each of the Blocks was randomly assigned to each child participant (see Appendix B).

In the Fluency CBM Blocks 1-3 measures, children were asked to name as many letters as they could in one-minute. If they did not know a letter, the research-assistant provided the name of the letter after 3-5 seconds. Incorrect responses (e.g., hesitations longer than three seconds, letter name substitutions such as “B” for “D”, letter omissions) were indicated with a slash and scored as incorrect. If the child was not able to identify any letter names correctly within the first row, the child was given a score of 0 and the measure was discontinued. The child was not penalized for imperfect dialect pronunciation or articulation or for skipping an entire row (i.e., a line was draw through the row but did not count in the scoring). The Fluency CBM Blocks 1-3 measures were scored by adding the number of correct letter responses and fluency responses were reported as the number of letters named correctly in one-minute.

Special designated procedures were in place to garner as much consistency as possible in the assessment process following the COVID-19 pandemic. On the designated assessment day, the parent, researcher and research-assistant met over Zoom to confirm

the assessments and assessment order that day. Once the assessments and order were confirmed, the parent called the child over to the table, placed the measure in front of the child and began reading the scripted directions aloud for that measure. Children began the measure when prompted by the word "Begin" and ended the measure when prompted with the word "Stop". All measures were scored by the research-assistant and researcher concurrently using Zoom. When the child began the measure, the research-assistant and researcher listened, watched and recorded the child's responses concurrently. The score obtained by the research-assistant was recorded as the final score. Once the final score was obtained for each of the Fluency CBM Blocks 1-3 measures, the researcher entered these scores into an excel spreadsheet (i.e., each data point represented a Block). Data points were entered into the spreadsheet sequentially based on the order in which Blocks were assessed.

(A) Baseline. The (A) Baseline condition covered sessions one, two or three consecutive sessions. All researcher-created measures were administered to each child individually by the research-assistant at school. Fluency CBM Block 1-3 measures were administered each session. These measures were counterbalanced among the children; each child was randomly assigned a measure form number (i.e., 1-15) for each session (see Table 5).

Table 5

Measures and Data Collection Across Conditions

Condition	Data Collection
(A) Baseline	Fluency CBM measures Blocks 1-3 (1x per session);
(C) Outcome Assessment	Fluency CBM measures Blocks 1-3 (1x per session)

(B) Extended Practice. The (B) Extended Practice condition covered three sessions and provided practice of letter names beyond mastery. No measures were administered in this condition.

(C) Outcome Assessment. The (C) Outcome Assessment condition covered two non-consecutive sessions. All researcher-created measures were administered to each child individually by a parent at home. Fluency CBM Block 1-3 measures were administered each session. These measures were counterbalanced among the children; each child was randomly assigned a measure form number (i.e., 1-15) for each session (see Table 5).

Interrater Reliability

Within this dissertation study, three researcher-created measures were used across (A) Baseline and (C) Outcome Assessment conditions. The CITI certified research assistant scored the researcher-created Fluency CMB Block 1-3 measures. The researcher scored all of the researcher-created measures for inter-rater reliability purposes. The researcher trained the research-assistant to score all of the researcher-created measures. Following training, the research-assistant and researcher administered the assessments and the research-assistant and researcher scored the assessments concurrently. The score

obtained by the research-assistant was recorded as the final letter naming fluency score. Interrater reliability (IRR) was calculated using the point-by-point agreement ratio between the two raters. The average percent of agreement for the researcher-created measures across Blocks were: Block 1 = 94%, Block 2 = 98%, Block 3 = 96%.

Treatment Fidelity

To address treatment fidelity, direct observations of two extended practice sessions was conducted by the research assistant. This represented 22% of the observed sessions for this condition. During the direct observations, the research assistant used an observational form to record whether or not a component occurred during the extended practice sessions. The research assistant considered whether 5 practice elements of treatment fidelity were assessed for each extended practice session (i.e., one day) within the extended practice condition (see Appendix C).

Chapter Four

Results

The Covid-19 pandemic muted the experimental control provided by the multiple baseline design across child participants. Thus, the results are discussed in terms of the extent to which each child experienced the extended practice as it would be typically be prescribed (i.e., immediately following mastery of letter names). Hudson most closely replicated the original study design. Furthermore, Hudson and Jason both experienced the most consistency in the (B2) Extended Practice at home sub-condition and (C) Outcome Assessment condition when the study was completed at home with a parent. While all parents graciously agreed to continue the study from home in limited numbers of sessions and followed their child's designated extended practice and assessment schedule created by the researcher, Hudson and Jason experienced the most consistency in term of extended practice and assessment sessions. Both Hudson and Jason's parent had designated time each day for their child to complete "schoolwork"; Dwayne however, completed extended practice and assessments on the designated days but at different times depending on his parent's work schedule. More specifically, he completed some sessions before his parent left for work, other sessions he completed after dinner once his parent was home. For these reasons, the individual results are described below first for Hudson followed by Jason, and finally for Dwayne.

Table 6 presents the means and standard deviation scores for each child across Blocks and the study conditions. In this study, data was collected at (A) Baseline,

Table 6

Means and Standard Deviations Across Blocks Children and Conditions

	Block 1		Block 2		Block 3	
Child	(A)	(C)	(A)	(C)	(A)	(C)
Jason						
M	*9	16.50	*12	17.50	*23	17.50
SD	*0	9.19	*0	14.85	*0	2.12
Dwayne						
M	22.00	23.00	30.50	27.00	39.00	29.50
SD	1.41	2.83	3.54	2.83	4.24	3.54
Hudson						
M	19	30.50	26.67	28.00	16.33	20.00
SD	1	2.12	4.04	1.41	1.15	2.83

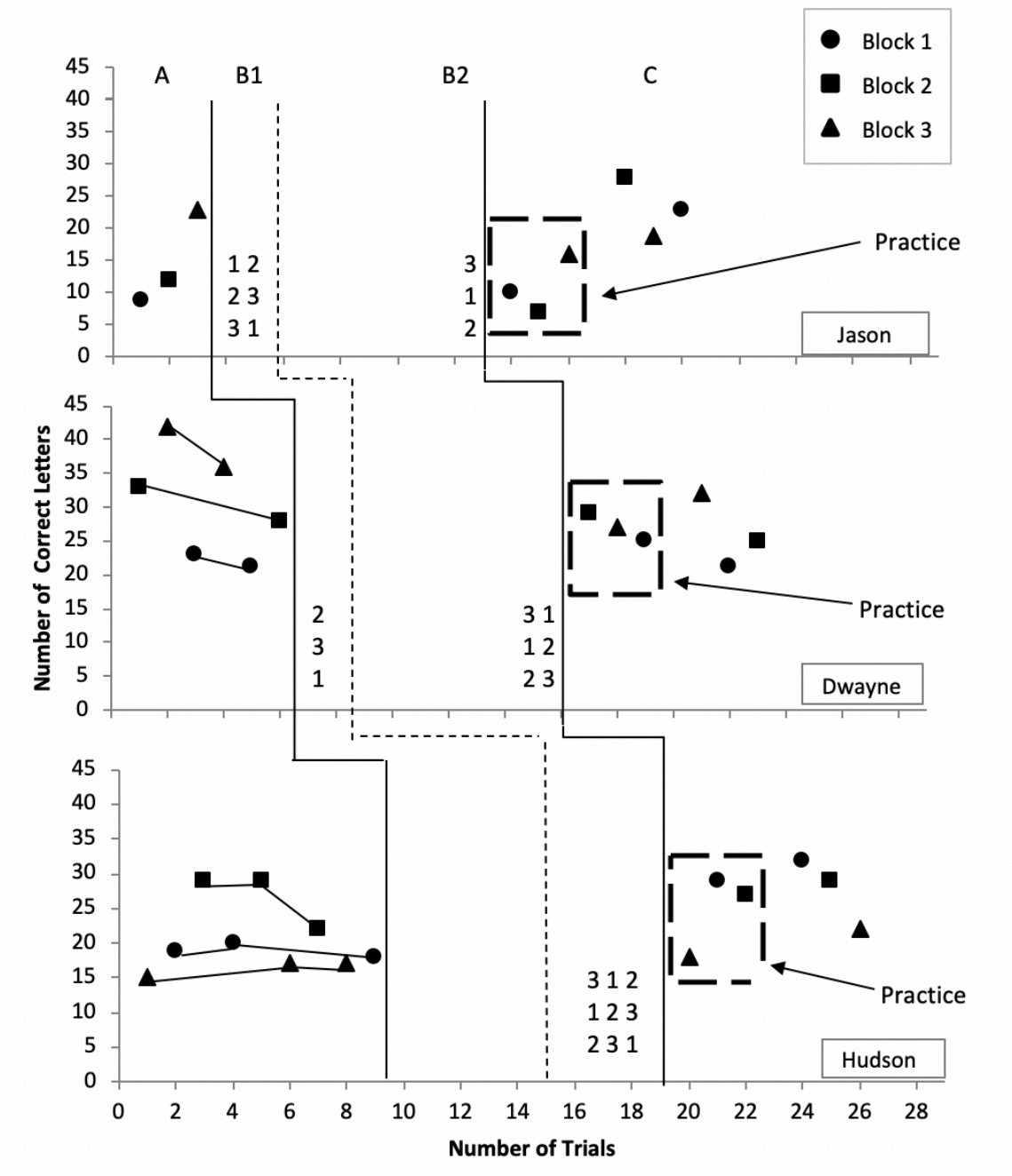
Note. (A) = Baseline, (C) = Outcome Assessment; * = single *lnf* Block score.

before children completed extended practice and during the (C) Outcome Assessment condition, after children completed extended practice. No data was collected during the (B) Extended Practice condition.

Figure 6 presents the scores for Blocks 1- 3 across the Multiple Baseline Design. Note that the first score for each of the three Blocks of letter names was a practice session. Thus, there is only one data point for each Block during the (C) Outcome Assessment condition. Table 7 presents the number of instructional sessions needed to achieve mastery for each of the Blocks by child.

Figure 6

Letter Naming Fluency Scores Across Blocks Children and Conditions



Note. B1 = Extended Practice at school, B2 = Extended Practice at home.

Table 7

Number of Instructional Sessions to Mastery

Child	Block 1	Block 2	Block 3
Jason	10	8	5
Dwayne	6	5	6
Hudson	14	9	N/A

Note. Hudson mastered Blocks 1 and 2 letter names only.

Hudson

Hudson experienced three consecutive (B2) Extended Practice at home sessions prior to completing assessments in this condition. These extended practice sessions were completed after a one-month delay following mastery instruction. Further, time did not allow for Block 3 letters names to be taught to mastery. Hudson completed two non-consecutive sessions in the (C) Outcome Assessment condition that resulted in two individual letter naming fluency scores for each Block: one practice score and one outcome score. These two scores were recorded and graphed using a line graph.

Block 1

Using the Fluency CBM Block 1 measure, Hudson was assessed on Block 1 letter names for two non-consecutive sessions resulting in two *lnf* scores: (29, 32). Hudson correctly identified 29 letter names per minute in the initial session and 32 letter names per minute in the final session (M = 30.50, SD = 2.12); her *lnf* score increased by 3. Furthermore, Hudson correctly identified 18 letter names per minute in the last

(A) Baseline session and 32 letter names per minute in the last (C) Outcome Assessment session; this indicated a gain of 14 for Block 1 letter naming fluency scores.

Block 2

Using the Fluency CBM Block 2 measure, Hudson was assessed on Block 2 letter names for two non-consecutive sessions resulting in two *lnf* scores: (27, 29). Hudson correctly identified 27 letter names per minute in the initial session and 29 letter names per minute in the final session (M = 28.00, SD = 1.41); her *lnf* score increased by 2. Furthermore, Hudson correctly identified 22 letter names per minute in the last (A) Baseline session and 29 letter names per minute in the last (C) Outcome Assessment session; this indicated a gain of 7 for Block 2 letter naming fluency scores.

Block 3

Using the Fluency CBM Block 3 measure, Hudson was assessed on Block 3 letter names for two non-consecutive sessions resulting in two *lnf* scores: (18, 22). Hudson correctly identified 18 letter names per minute in the initial session and 22 letter names per minute in the final session (M = 20.00, SD = 2.83); her *lnf* score increased by 4. Furthermore, Hudson correctly identified 17 letter names per minute in the last (A) Baseline session and 22 letter names per minute in the final (C) Outcome Assessment session; this indicated a gain of 5 for Block 3 letter naming fluency scores.

Jason

Jason experienced one (B2) Extended Practice at home session prior to completing assessments in this condition. One caveat for (B1) Extended Practice at school was that these two sessions were completed one-month earlier.

Block 1

Using the Fluency CBM Block 1 measure, Jason was assessed on Block 1 letter names for two sessions resulting in two *lnf* scores: (10, 23). In Block 1 Jason correctly identified 10 letter names per minute in the first session and 23 letter names per minute in the final session (M = 16.50, SD = 9.19); his *lnf* score increased by 13. In addition, Jason correctly identified 9 letter names per minute in (A) Baseline and 23 letter names per minute in the final (C) Outcome Assessment session; this indicated a gain of 14 for Block 1 letter naming fluency scores.

Block 2

Using the Fluency CBM Block 2 measure, Jason was assessed on Block 2 letter names for two sessions resulting in two *lnf* scores: (7, 28). In Block 2, Jason correctly identified 7 letter names per minute in the first session and 28 letter names per minute in the final session (M = 17.50, SD = 14.85); his (lnf) score increased by 21. Additionally, Jason correctly identified 12 letter names per minute in (A) Baseline and 28 letter names per minute in the final (C) Outcome Assessment session; this indicated a gain of 16 for Block 2 letter naming fluency scores.

Block 3

Using the Fluency CBM Block 3 measure, Jason was assessed on Block 3 letter names for two sessions resulting in two *lnf* scores: (16, 19). In Block 3, Jason correctly identified 16 letter names per minute in the first session and 19 letter names per minute in the final session (M = 17.50, SD = 2.12); his *lnf* score increased by 3. Furthermore, Jason correctly identified 23 letter names per minute in (A) Baseline and 19 letter names per

minute in the final (C) Outcome Assessment session; this indicated a loss of 4 for Block 3 letter naming fluency scores.

Dwayne

Dwayne experienced two consecutive (B2) Extended Practice sessions at home prior to completing assessments in this condition. One caveat for (B1) Extended Practice at school was that one session was completed one-month earlier.

Block 1

Using the Fluency CBM Block 1 measure, Dwayne was assessed on Block 1 letter names for two sessions resulting in two *lnf* scores: (25, 21). In Block 1, Dwayne correctly identified 25 letter names per minute in the first session and 21 letter names per minute in the final session (M = 23.00, SD = 2.83); his *lnf* score decreased by 4. Furthermore, Dwayne correctly identified 21 letter names per minute in the final (A) Baseline session and 21 letter names per minute in the final (C) Outcome Assessment session; this indicated that *lnf* scores maintained for Block 1 letter names.

Block 2

Using the Fluency CBM Block 2 measure, Dwayne was assessed on Block 2 letter names for two sessions resulting in two *lnf* scores: (29, 25). In Block 2, Dwayne correctly identified 29 letter names per minute in the first session and 25 letter names per minute in the final session (M = 27.00, SD = 2.83); his *lnf* score decreased by 4. Furthermore, Dwayne correctly identified 28 letter names per minute in the final (A) Baseline session and 25 letter names per minute in the final (C) Outcome Assessment session; this indicated a loss of 3 for Block 2 letter naming fluency scores.

Block 3

Using the Fluency CBM Block 3 measure, Dwayne was assessed on Block 3 letter names for two sessions resulting in two *lnf* scores: (27, 32). In Block 3, Dwayne correctly identified 27 letter names per minute in the first session and 32 letter names per minute in the final session (M = 29.50, SD = 3.54); his *lnf* score increased by 5. Furthermore, Dwayne correctly identified 36 letter names per minute in the final (A) Baseline session and 32 letter names per minute in the final (C) Outcome Assessment session; this indicated a loss of 4 for his Block 3 letter naming fluency scores.

Chapter Five

Discussion

Before discussing the results of the study, I submit this dissertation study in the context of the Covid-19 pandemic and its influence on the study procedures and my independent research skills. Clearly, as noted above in the "Results" section, the Covid-19 pandemic resulted in major changes to the original study and its planned procedures. These changes, in turn, compromised the experimental rigor of this study. Nevertheless, conducting this study in the context of the pandemic provided me the opportunity to fully test the research skills that I acquired during my time at the University of Nebraska, Lincoln. These skills included: defining and outlining a research area with a clear question, sourcing the relevant background research, organizing and presenting the outcomes, and drawing conclusions from the data. Additionally, the study enabled me to pilot the study procedures. This will facilitate my conduct of the study when I take my first professional position.

This dissertation study addressed the research question: What is the effect of extended practice of letter names on the number of letter names (from each Block of letters) that children can identify correctly in one-minute? Overall across child participants, there were minimal intervention effects. These minimal effects are supported visually on the line graphs across children. For two child participants, Hudson and Jason, Block 1 fluency scores show an increase in fluency scores before and after extended practice. However, most fluency scores on the line graphs across Blocks show minimal letter naming fluency gains or a lack of fluency gains before and after extended practice,

demonstrating no clear intervention effects. Based on these results it is safe to conclude that extended practice was ineffective. However, I contend that using these results to judge the efficacy of the extended practice intervention is a flawed approach due to adverse effects of the Covid-19 pandemic on the original study methodology.

All children experienced extended practice, yet only one child experienced consecutive extended practice following mastery instruction. Even in this case, the extended practice was delayed a month and only two Blocks of letters names were taught to mastery. The original study design included consecutive extended practice immediately following mastery of letter names over three consecutive sessions for each child. Unfortunately, consecutive extended practice was prevented by school closure related to the pandemic. Only one of the children experienced consecutive extended practiced as intended; specifically, Hudson became the only child to experience extended practice over three frequent and consecutive, sessions (e.g., Monday, Wednesday and Friday). The other two children experienced a month gap between extended practice sessions. This inequality in extended practice created a problem because not all children experienced extended practice in the same way.

A second factor related to flawed implementation was the variations in the home environment with extended practice. Using parents as "supervisors" of extended practice sessions rather than the researcher as the sole supervisor allowed children to complete the study remotely but with limited experimental control. It is important to note that that the "computer game" *FSRF* offered some experimental control because each child practiced Blocks in the same way, using the same motivation and structure. Also, numerous steps

were taken by the researcher to maintain experimental control during home extended practice sessions. For example, the researcher provided individual parent training (e.g., logging in, choosing a Block, choosing the length of practice, progress monitoring) before parents began supervising extended practice session(s) with their child. In order to work toward uniformity, the researcher provided parents with a personalized schedule for their child so parents could keep track of the days/sessions of extended practice. Finally, after each remote extended practice session, the researcher confirmed that extended practice had occurred using the raw data provided within *FSRF*. Despite the steps taken to maintain experimental control throughout the (B) Extended Practice condition, fidelity checks were not completed during remote extended practice sessions, and a variety of challenges occurred that confirmed that extended practice sessions were not equivalent across children. For example, Jason's parent mentioned that behavior became an issue when he insisted on pressing the correct letter name with his nose rather than his finger. Also, parent work schedules dictated when parents could supervise extended practice sessions. For example, Hudson's parent and Jason's parent each worked from home or chose not to work; they designated time for extended practice at the same time each day. Dwayne's parent's work schedule changed daily; consequently, his parent supervised extended practice at different times each day. Therefore, uniformity varied given the conditions in each home (i.e., time of day when parent was available, activity of nearby siblings, etc.); therefore, children did not complete extended practice under similar conditions.

Limitations and Areas for Future Research

Multiple study limitations are worth noting. First, the small sample size limits the ability to generalize findings to different children (Kazdin, 2011). Second, in this study, children established mastery of a Block by correctly identifying a Block of letter names with 100% accuracy. Requiring young children to establish mastery only once before teaching the subsequent Block of letters may not have been sufficient; two consecutive mastery sessions may have made a stronger case that mastery was established. However, time was already an issue without the additional mastery check. A third limitation was related to the time-delay. Specifically, there was a delay between established mastery and completion of extended practice. Hudson, the child who most closely replicated the original study, after establishing mastery of Blocks 1 and 2 letter names and after completing (A) Baseline assessments, waited one-month before completing extended practice. One could argue that by the time she began extended practice sessions she had forgotten the Block letters she mastered due to the passage of time. Ebbinghaus's research around memory and the forgetting curve applies here; he concluded that the forgetting curve describes a loss of information and that memory fades with time (Ebbinghaus, 1885). It is possible, perhaps even probable that even if Hudson had confirmed mastery twice, it would have made no difference in letter recall because the wait time between mastery and extended practice was far too long. A fourth limitation is that the study methodology was seriously flawed. Due to the Covid-19 pandemic, the number of sessions each child experienced in the (A) Baseline and (C) Outcome Assessment conditions were shortened and minimal number of data points collected in an

effort to complete the study before the school closed. Across the (A) Baseline condition: Jason's three original sessions were reduced to one session only; Dwayne's six original sessions were reduced to two sessions and Hudson's nine original sessions were reduced to three total sessions. At the start of the pandemic, the exact time for school closure was unclear. Therefore, it appeared likely that the study could be completed in nine short sessions before the school closed. This didn't happen; instead, each child completed three study sessions before school closure. Arguably, once IRB granted the researcher permission to complete the study remotely, the researcher could have started the study over from the beginning and completed the original number of sessions with children across conditions instead of completing a study with a flawed methodology. As the researcher and author of this study, my answer to that is related to uncertainty and parent expectations. Completing the study with reduced sessions meant that parent involvement was minimal (i.e., between three-five sessions). Had I started over and completed the original number of sessions with each child, parent involvement would have been considerable: a minimum of nine total sessions (i.e., three weeks), maximum of 15 total sessions (i.e., five weeks). While all of the parents graciously agreed to complete the remaining reduced sessions remotely, I believe I wouldn't have gotten their cooperation had I had requested the three-five weeks of participation for the remote study.

This study points to implications for future research on extended practice. Despite the caveats, limitations and minimal data collection, the present study gives an indication that extended practice can work. For example, Hudson, the sole participant who most closely replicated the original study design, made fluency strides forward. Across Blocks,

Hudson's letter naming fluency scores improved despite the time delay before extended practice; furthermore, there was an effect of extended practice for Block 1 letter names. While we cannot draw conclusions about extended practice from one study, future research can certainly be continued to further examine the concept of extended practice.

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APPENDIX A

NOTIFICATION AND INFORMED CONSENT LETTERS

INFORMATION SHEET

APPROVAL LETTER

PARENT/LEGAL GUARDIAN INFORMED CONSENT

REVISED PARENT/LEGAL GUARDIAN INFORMED CONSENT

INFORMATION SHEET

My name is Samantha Cooper and I am a Doctoral Student at the University of Nebraska-Lincoln. I am doing a research study for my dissertation at your school. The purpose of my study is to assess the effects of additional practice beyond what is typically provided to children on their ability to name letters. I have met with the principal Sister Cecilia and your child's teacher Mrs. Schafers and I have described the purpose and how the study will be conducted. They have agreed to allow me to conduct the study at Saint Teresa School.

If you are interested in finding out more about the study and the potential for your child to participate, please sign below and provide your preferred method of contact. I will contact you to describe the study and your child's research rights. Providing this information and meeting with me does not obligate you to participate in this study.

Thank you for your consideration.

Samantha Cooper

Parent Name:

_____
(Please print)

_____
(Please sign)

Preferred Method of Contact:

_____
(Phone number)

_____
(Email)

University of Nebraska Lincoln

Official Approval Letter for IRB project #19811 - New Project Form

December 7, 2019

Samantha Cooper
Department of Special Education and Communication Disorders
BKC 247B UNL NE 685830738

J Ron Nelson
Department of Special Education and Communication Disorders
BKC 301 UNL NE 685830732

IRB Number: 20191219811EX
Project ID: 19811
Project Title: Assessing the Effects of Extended Practice on Letter Naming Fluency

Dear Samantha:

This letter is to officially notify you of the certification of exemption of your project for the Protection of Human Subjects. Your proposal is in compliance with this institution's Federal Wide Assurance 00002258 and the DHHS Regulations for the Protection of Human Subjects (45 CFR 46) and has been classified as exempt. Exempt categories are listed within HRPP Policy #4.001: Exempt Research available at: http://research.unl.edu/researchcompliance/policies-procedures/.

o Date of Final Exemption: 12/7/19
o Review conducted using exempt category 1 at 45 CFR 46.101
o Funding (Grant congruency, OSP Project/Form ID and Funding Sponsor Award Number, if applicable): N/A

This project should be conducted in full accordance with all applicable sections of the IRB Guidelines and you should notify the IRB immediately of any proposed changes that may affect the exempt status of your research project. You should report any unanticipated problems involving risks to the participants or others to the Board.

You are authorized to implement this study as of the Date of Final Approval: 12/07/2019.

If you have any questions, please contact the IRB office at 402-472-6965.

Sincerely,

Rachel Wenzl, CIP
for the IRB

Full Accreditation

University of Nebraska Lincoln

PARENT/LEGAL GUARDIAN INFORMED CONSENT

IRB #:

Participant Study Title:

Assessing the Effects of Extended Practice on Letter Naming Fluency

Authorized Study Personnel

Principal Investigator: Samantha Cooper Office:(928)503-1453, samantha.cooper@huskers.unl.edu

Secondary Investigator: Dr. J. Ron Nelson Office: (402)472-5496, nelson@unl.edu

Key Information:
If you agree that your child may participate in this study, the project will involve:

- Three children (males and females) enrolled in preschool.
- Children whose primary home language is English.
- Children will complete assessments, receive letter name instruction and extended practice of letter names.
- Approximately 21 instructional sessions are required.
- The instructional sessions will take 20-25 minutes.
- All assessments, instruction and extended practice will take place at your child's school at a time and place designated by your child's teacher.
- There are minimum risks associated with this study. The only known risk is loss of confidentiality. Steps have been taken to minimize this potential risk.
- You will be provided a copy of the consent/assent form.

Invitation

Your child is invited to take part in this research study. The information in this form is meant to help you decide whether or not to allow your child to participate. Please stop me at any time if you have questions as we go over the informed consent form.

Why are is your child being asked to be in this research study?

Your child is being asked to be in this study because they are enrolled in a pre-K classroom at Saint Teresa School.

What is the reason for doing this research study?

Children who acquire the ability to name letters quickly and effortlessly are less likely to experience reading difficulties. This research study is designed to understand if extended practice is effective for helping children to name letters quickly and effortlessly. This will help schools to decide whether or not extended practice should be conducted.

What will be done during this research study?

In this study, your child will complete five experimental conditions: (A) Baseline, (B1-B3) Mastery, (C) Summary Assessment, (D) Extended Practice, and (E) Summary Assessment.

In the Baseline condition there is no instruction. Instead, your child will be assessed on which letter names they know. These assessments will take approximately 20-25 minutes and will be completed in 1 session (i.e., day).

In the Mastery condition, your child will receive instruction to help them master letter names. The instruction in this condition will be conducted across 15 instructional sessions. These instructional sessions will last 20-25 minutes. Children will also complete the same mastery assessments conducted during Baseline condition.

In the Summary Assessment condition, there is no instruction. Instead, your child will be assessed on which letter names they know. These assessments will take approximately 20-25 minutes and will be completed in 1 session (i.e., day).

In the Extended Practice condition, your child will practice the letter names they have mastered using a computer game *First Steps to Reading Fluency*. Extended Practice will take approximately 20-25 minutes. Children will complete the same fluency assessments conducted during Baseline condition.

In the Summary Assessment condition, there is no instruction. Instead, your child will be assessed on which letter names they know. These assessments will take approximately 20-25 minutes and will be completed in 1 session (i.e., day).

What are the possible risks of being in this research study?

The only known risks to your child is the potential loss of confidentiality. Steps will be taken to minimize this risk.

What are the possible benefits to your [child/legal] ward?

The direct benefit to your child is the ability to name letters quickly and effortlessly. This ability has been shown to reduce risk of experiencing reading difficulties.

What are the possible benefits to other people?

The benefits to society may include better understanding of whether or not extended practice results in children being able to quickly and effortlessly name letters.

What are the alternatives to being in this research study?

Instead of being in this research study you can choose not to allow your child to participate.

What will being in this research study cost you or your [child/legal ward]?

There is no cost to you or your child to be in this research study.

Will your [child/legal ward] be compensated for being in this research study?

Your child will not receive any financial compensation for their participation in this study. We will provide your child stickers after each of the instructional sessions.

What should you do if your [child/legal ward] has a problem during this research study?

Your child's welfare is the major concern of every member of the research team. If there is a problem as a direct result of being in this study, you should immediately contact one of the people listed at the beginning of this consent form.

How will information about your [child/legal ward] be protected?

Reasonable steps will be taken to protect the privacy and the confidentiality of your child's study data. Immediately after each session, your child's name will be removed and replaced with a unique pseudonym on all assessments. Additionally, all reports, papers and presentations will include only pseudo names.

All assessments will be stored in a locked cabinet in a locked room. Assessments will only be seen by the research team during the study and for 5 years after the study is complete. Additionally, data will be stored electronically through a secure server at the University of Nebraska-Lincoln. Data will only be seen by the research team during the study and for 5 years after the study is complete.

The only persons who will have access to your child's research records are the study personnel, the Institutional Review Board (IRB), and any other person, agency, or sponsor as required by law or contract. The information from this study may be published in scientific journals or

presented at scientific meetings but the data will be reported as group or summarized data and your identity will be kept strictly confidential.

What are your [child's/legal ward's] rights as a research subject?

You and your child may ask any questions concerning this research and have those questions answered before agreeing to participate in or during the study.

For study related questions, please contact the investigator(s) listed at the beginning of this form.

For questions concerning your rights or complaints about the research contact the Institutional Review Board (IRB):

- Phone: 1(402)472-6965
- Email: irb@unl.edu

What will happen if you decide not allow your [child/legal ward] to be in this research study or decide they need to stop participating once they start?

You can decide your child should not to be in this research study, or you can have your child stop being in this research study ("withdraw') at any time before, during, or after the research begins for any reason. Deciding not to be allow your child to be in this research study or deciding to withdraw will not affect you or your child's relationship with the investigator or with the University of Nebraska-Lincoln or Saint Teresa School.

You and your child will not lose any benefits to which you are entitled.

Documentation of informed consent

You are voluntarily making a decision whether or not to allow your child to be in this research study. Signing this form means that (1) you have read and understood this consent form, (2) you have had the consent form explained to you, (3) you have had your questions answered and (4) you have decided to allow your child to be in the research study. You will be given a copy of this consent form to keep.

Participant Feedback Survey

The University of Nebraska-Lincoln wants to know about your research experience. This 14 question, multiple-choice survey is anonymous. This survey should be completed after your participation in this research. Please complete this optional online survey at: http://bit.ly/UNLresearchfeedback.

Name of Child to be included:

_____

(Name of Child: Please print)

Parent/Legal Guardian Name:

_____
(Name of Parent/Legal Guardian: Please print)

Parent/Legal Guardian Signature:

_____ _____
Signature of Parent/Legal Guardian Date

Individual Obtaining Content:

_____ _____
Signature of Investigator Date

University of Nebraska Lincoln

Official Approval Letter for IRB project #19811 - Change Request Form

April 1, 2020

Samantha Cooper
Department of Special Education and Communication Disorders
BKC 247B UNL NE 685830738

J Ron Nelson
Department of Special Education and Communication Disorders
BKC 301 UNL NE 685830732

IRB Number: 20191219811EX
Project ID: 19811
Project Title: Assessing the Effects of Extended Practice on Letter Naming Fluency

Dear Samantha:

The Institutional Review Board for the Protection of Human Subjects has completed its review of the Request for Change in Protocol submitted to the IRB.

The change request form has been approved to include the following changes and procedures as described in the form:

Moving Phase 2 and Extended Practices to home learning and remote activities.
This modification does not change the review type or the review category. The project still remains to be reviewed and approved under Exempt, category 1. Limited Review not required.
Please be aware, form ID #54664 has been administratively closed given that it was similar in nature to this change request form (#54758) which is more comprehensive to the changes moving to remote activities.

We wish to remind you that the principal investigator is responsible for reporting to this Board any of the following events within 48 hours of the event:
* Any serious event (including on-site and off-site adverse events, injuries, side effects, deaths, or other problems) which in the opinion of the local investigator was unanticipated, involved risk to subjects or others, and was possibly related to the research procedures;
* Any serious accidental or unintentional change to the IRB-approved protocol that involves risk or has the potential to recur;
* Any protocol violation or protocol deviation
* An incarceration of a research participant in a protocol that was not approved to include prisoners
* Any knowledge of adverse audits or enforcement actions required by Sponsors
* Any publication in the literature, safety monitoring report, interim result or other finding that indicates an unexpected change to the risk/benefit ratio of the research;
* Any breach in confidentiality or compromise in data privacy related to the subject or others; or
* Any complaint of a subject that indicates an unanticipated risk or that cannot be resolved by the research staff.

This letter constitutes official notification of the approval of the protocol change. You are therefore authorized to implement this change accordingly.

If you have any questions, please contact the IRB office at 402-472-6965.

Sincerely,

Rachel Wenzl, CIP
for the IRB

Full Accreditation

University of Nebraska Lincoln

PARENT/LEGAL GUARDIAN INFORMED CONSENT

IRB #:

Participant Study Title:

Assessing the Effects of Extended Practice on Letter Naming Fluency

Authorized Study Personnel

Principal Investigator: Samantha Cooper Office: (928)503-1453, samantha.cooper@huskers.unl.edu

Secondary Investigator: Dr. J. Ron Nelson Office: (402)472-5496, nelson@unl.edu

Key Information:
If you agree that your child may participate in this study, the project will involve:

- Three children (males and females) enrolled in preschool.
- Children will complete letter name practice and letter name assessments.
- The study will be conducted over the course of 1 week.
- Approximately 5 instructional sessions are required.
- Instructional sessions will occur 2 times per day, 3 times per week.
- Each instructional session will last approximately 20-25 minutes. The instructional sessions will occur on days recommended by the primary investigator. On days when 2 instructional sessions are given, a break of 1 hour (60 minute) break is required.
- All letter name practice will require internet access and an electronic device (e.g., computer, Microsoft Surface Pro).
- All letter name assessments will be administered and scored in real-time using the cloud conferencing application Zoom.
- Each letter name assessment will be administered individually by a parent and scored by the primary investigator and the research assistant.
- There are minimum risks associated with this study. The only known risk is loss of confidentiality. Steps have been taken to minimize this potential risk.
- You will be provided a copy of the consent/assent form.

Invitation

Your child is invited to take part in this research study. The information in this form is meant to help you decide whether or not to allow your child to participate. Please stop me at any time if you have questions as we go over the informed consent form.

Why are is your child being asked to be in this research study?

Your child is being asked to be in this study because they are enrolled in a pre-K classroom at Saint Teresa School and the teacher believes they would benefit from letter name instruction.

What is the reason for doing this research study?

Children who acquire the ability to name letters quickly and effortlessly are less likely to experience reading difficulties. This research study is designed to understand if extended practice is effective for helping children to name letters quickly and effortlessly. This will help schools to decide whether or not extended practice should be conducted.

What will be done during this research study?

In this study, your child will complete approximately 5, instructional sessions over the course of 1 week. Each instructional session will last approximately 20-25 minutes.

Before St. Theresa School was shut down, your child was taught 41 letter names to mastery. Now your child will complete letter name practice using an app entitled "First Steps to Reading Fluency." In this app, your child will practice letter names in a "Racing Game" where your child's character will race an opponent. Each instructional session will last 20-25 minutes. The number of instructional sessions will depend on how much letter name practice your child completed before the school was closed. Each child will complete a maximum of 3, letter name practice sessions over 2 days (i.e., approximately 60 total minutes). Specific information and training will be provided to parents by the primary investigator how to log on and practice letter names using the app. In addition, parents will receive a specific practice schedule for each child by the primary investigator.

Following letter name practice, the study will end with final assessments of how well your child knows letter names. Each child will complete 2 instructional sessions of letter name assessments. Each session will last 20 minutes (i.e., approximately 40 total minutes).

What are the possible risks of being in this research study?

The only known risk to your child is the potential loss of confidentiality. Steps will be taken to minimize this risk.

What are the possible benefits to your [child/legal] ward?

Your child may benefit from learning letter names quickly and effortlessly.

What are the possible benefits to other people?

The benefits to society may include better understanding of whether or not extended practice results in children being able to quickly and effortlessly name letters.

What are the alternatives to being in this research study?

Instead of being in this research study you can choose not to allow your child to participate and they will continue to receive all educational instruction through St. Teresa School.

What will being in this research study cost you or your [child/legal ward]?

There is no cost to you or your child to be in this research study.

Will your [child/legal ward] be compensated for being in this research study?

Your child will not receive any financial compensation for their participation in this study. We will provide your child stickers after each session.

What should you do if your [child/legal ward] has a problem during this research study?

Your child's welfare is the major concern of every member of the research team. If there is a problem as a direct result of being in this study, you should immediately contact one of the people listed at the beginning of this consent form.

How will information about your [child/legal ward] be protected?

Reasonable steps will be taken to protect the privacy and the confidentiality of your child's study data. The same day your child completes an assessment(s), your child's name will be removed and replaced with a unique pseudonym. Additionally, all reports, papers and presentations will include only pseudo names.

All assessments will be stored in a locked cabinet in a locked room. Assessments will only be seen by the research team during the study and for 5 years after the study is complete. Additionally, data will be stored electronically through a secure server at the University of Nebraska-Lincoln. Data will only be seen by the research team during the study and for 5 years after the study is complete.

The only persons who will have access to your child's research records are the research study personnel, the Institutional Review Board (IRB), and any other person, agency, or sponsor as required by law or contract. The information from this study may be published in scientific journals or presented at scientific meetings but the data will be reported as group or summarized data and your identity will be kept strictly confidential.

What are your [child's/legal ward's] rights as a research subject?

You and your child may ask any questions concerning this research and have those questions answered before agreeing to participate in or during the study.

For study related questions, please contact the investigator(s) listed at the beginning of this form.

For questions concerning your rights or complaints about the research contact the Institutional Review Board (IRB):

- Phone: 1(402)472-6965
- Email: irb@unl.edu

What will happen if you decide not allow your [child/legal ward] to be in this research study or decide they need to stop participating once they start?

You can decide your child should not to be in this research study, or you can have your child stop being in this research study ("withdraw') at any time before, during, or after the research begins for any reason. Deciding not to be allow your child to be in this research study or deciding to withdraw will not affect you or your child's relationship with the investigator or with the University of Nebraska-Lincoln or Saint Teresa School.

You and your child will not lose any benefits to which you are entitled.

Documentation of informed consent

You are voluntarily making a decision whether or not to allow your child to be in this research study. Signing this form means that (1) you have read and understood this consent form, (2) you have had the consent form explained to you, (3) you have had your questions answered and (4) you have decided to allow your child to be in the research study. You will be given a copy of this consent form to keep.

Participant Feedback Survey

The University of Nebraska-Lincoln wants to know about your research experience. This 14 question, multiple-choice survey is anonymous. This survey should be completed after your participation in this research. Please complete this optional online survey at: http://bit.ly/UNLresearchfeedback.

Name of Child to be included:

_____
(Name of Child: Please print)

Parent/Legal Guardian Name:

_____
(Name of Parent/Legal Guardian: Please print)

Parent/Legal Guardian Signature:

_____ _____
Signature of Parent/Legal Guardian Date

Individual Obtaining Content:

_____ _____
Signature of Investigator Date

APPENDIX B

RESEARCHER-CREATED MEASURES

MASTERY CBM DIRECTIONS

MASTERY CBM (BLOCKS 1-3)

FLUENCY CBM DIRECTIONS

FLUENCY CBM (BLOCKS 1-3, FORMS 1-15)

Mastery CBM Directions

Directions for Administration:

1. Place the Mastery (CBM) Block 1-3 Assessment in front of the child.
2. Say these specific directions to the child:

Here are some letters (*point*). ***I want you to tell me the name of as many letters as you can. If you come to a letter you don't know, I'll tell it to you. Put your finger on the first letter. What is the name of this letter***?

Directions for Scoring:

1. Incorrect responses are marked with a slash (/).
2. If a student comes to a letter name and stops, ask the child:

Do you know the name of this letter?

If the child says "No", tell them to say the *next* letter and mark the unknown letter incorrect.

3. Self-corrections are counted as correct.

Mastery CBM
Block 1

___ t
___ r
___ l
___ q
___ d
___ h
___ f
___ a
___ u
___ s
___ g
___ o
___ i
___ m

Mastery CBM
Block 2

___ k
___ L
___ w
___ v
___ F
___ c
___ e
___ T
___ j
___ M
___ y
___ b
___ n
___ p

Mastery CBM
Block 3

___ H
___ A
___ N
___ z
___ Q
___ R
___ J
___ B
___ I
___ x
___ D
___ E
___ G

Fluency CBM Directions

Directions for Administration:

1. Place a copy of the Fluency CBM Block 1-3 Assessment in front of the child.

2. Say these specific directions:

Here are some letters (point). I want you to tell me the NAME of as many letters as you can. When I say "Begin", start here (point to first letter) and go across the page (point). Point to each letter and tell me the NAME of that letter. If you come to a letter you don't know, I'll tell it to you. Put your finger on the first letter. Ready? Begin.

3. Start the stopwatch. If the child provides the letter sound rather than the name, say:

Remember to tell me the letter name, not the sound it makes.

This prompt may be provided once during the assessment. If the child continues providing the letter sounds, mark each letter as incorrect and indicate what the student did at the bottom of the page.

4. At the end of one minute, place a bracket (]) after the last letter named and say:

Stop.

Fluency CBM Directions

Directions for Scoring:
1. Discontinue Rule- If the child does not get any correct letter names within the first row, discontinue the task and record a score of 0. 2. 3 Second Rule- If the child hesitates for 3 seconds on a letter, score the letter incorrect, provide the correct letter, point to the next letter, and say: What letter? This prompt may be repeated. For example, if the letters are "t L s " and the child says, "t" (3 seconds), prompt by saying, "L" (point to s) What letter? 3. Self-corrections are counted as correct. 4. Incorrect Letter- A letter is incorrect if the child substitutes a different letter for the stimulus letter (e.g., "B" for "D"). 5. Omissions- A letter is incorrect if the child omits or skips over a letter. 6. Articulation and dialect- The child is not penalized for imperfect pronunciation due to dialect, articulation, or second language interference. 7. Skips row- If a child skips an entire row, draw a line through the row and do not count the row in scoring.
Note. For similar font (e.g., upper case "I" and lower case "l" are difficult to distinguish. Before starting the assessment, remind the child that they are practicing letters that they were taught during the lesson.

Fluency CBM
Block 1 Form 1

t d l u i h d l f f

r t r q l q t h i r

l m s a f m g d g o

q f a r s f h r h s

d o g s d i u m s i

g t i t t s f g d h

f d s g m a i t m l

a t d o q l s a q g

l m l t l u o o r q

m q h a r r q u t a

d g o a l u f r h q

Total: _____

Fluency CBM
Block 1 Form 2

a	m	r	d	f	l	s	g	u	t
q	i	h	o	m	o	r	t	u	d
i	g	h	l	a	q	s	f	a	d
o	t	f	m	l	g	r	h	u	i
q	t	m	h	u	r	o	a	d	i
q	g	f	s	l	m	h	l	q	d
s	u	r	i	o	g	a	t	f	h
m	t	a	r	s	g	f	i	o	q
l	d	u	a	g	u	h	f	d	l
s	m	r	q	t	o	i	m	q	u
g	s	u	l	f	h	i	q	d	a

Total: _____

Fluency CBM
Block 1 Form 3

g d s a m f t r q o

i l h u d g o i h a

r u m t q l s f q f

g l u d i h r t o a

s m q h u f o i a l

t d m s r g h o a s

i f r q g l m t d u

t f l u d o m s r i

q g h a t a i l o g

s d q u h r f m g r

f a i g s l q t f d

Total: _____

Fluency CBM
Block 1 Form 4

f m d a o t q g h i

r l u s r h f a s u

q t o d l g i m d l

s m q h f a g r o a

i t o h i t q d u m

r l a f g s u s q i

g o d f r t m h a l

g r f m o i d u q l

a t h s d q l g s a

t r i m u o f h r f

h s m r u o q f t a

Total: _____

Fluency CBM
Block 1 Form 5

q h a o u i r f d t

g m s l d f h m u i

t a l r g s o q l h

m a d u i g q s f r

o t g q d t f l o a

s h m r i u a o h u

t f l s d r q g m i

s m a l f u t h o g

r q i d m h q g i t

l d u a f r s o m r

g s i q l u d t o m

Total: _____

Fluency CBM
Block 1 Form 6

f a s q o r m u d i

t g l h a t l d s m

i f u q h o g r s r

t a h q l i u m g d

o f d h r f m u g a

q t l i s o q o l a

r g m u d i f s h t

a i d q t r m o h g

l s f u r i h u l q

g o f d a m s t u i

d l g r s q m u i a

Total: _____

Fluency CBM
Block 1 Form 7

m	f	h	t	r	d	o	q	g	l
a	s	u	i	r	g	i	q	t	f
u	d	h	m	o	a	s	l	l	i
s	q	a	g	f	o	u	m	t	d
h	r	f	g	u	d	r	h	l	o
q	a	s	i	t	m	m	i	h	d
a	q	f	t	s	r	o	g	l	u
i	r	f	h	u	m	q	t	a	s
l	d	o	u	h	s	i	r	m	q
t	d	o	o	a	l	f	u	h	s
u	m	t	a	g	l	s	d	h	f

Total: _____

Fluency CBM
Block 1 Form 8

s	q	r	a	m	f	i	u	l	d
t	g	o	h	r	q	m	t	g	a
s	d	i	u	h	o	f	l	l	t
u	s	h	g	i	a	f	o	m	q
r	d	i	a	d	r	m	g	s	u
f	o	t	l	u	q	m	f	h	d
o	r	l	i	s	q	g	a	t	u
f	d	a	l	o	r	i	t	m	g
s	q	u	h	s	m	q	i	u	f
l	a	t	r	h	g	d	o	r	a
q	m	l	d	u	f	h	i	g	s

Total: _____

Fluency CBM
Block 1 Form 9

s	q	r	a	m	f	i	u	l	d
t	g	o	h	r	q	m	t	g	a
s	d	i	u	h	o	f	l	l	t
u	s	h	g	i	a	f	o	m	q
r	d	i	a	d	r	m	g	s	u
f	o	t	l	u	q	m	f	h	d
o	r	l	i	s	q	g	a	t	u
f	d	a	l	o	r	i	t	m	g
s	q	u	h	s	m	q	i	u	f
l	a	t	r	h	g	d	o	r	a
q	m	l	d	u	f	h	i	g	s

Total: _____

Fluency CBM
Block 1 Form 10

o d i r t a g s u l

f m q h q s g f h i

a o m l t u d r l o

t r i q h m g u d s

f a f g q m l o i t

r s u d a h g m o a

s h u r d q l t f i

m o d q h t a l s i

f r u g m r s i d t

h a q l u o f g o a

g f q s u l t m d r

Total: _____

Fluency CBM
Block 1 Form 11

t f g r q d s m u a

h i l o u r g q m f

h t l a d o s i d i

u h q f a g s l m o

t r s r f g t a l i

m q d o u h u i r d

l q h m s o t f g a

g f t q r a h d o i

u s l m h a d u g o

i f l t q r m s r f

a l m q g t h d u s

Total: _____

Fluency CBM
Block 1 Form 12

t f g r q d s m u a

h i l o u r g q m f

h t l a d o s i d i

u h q f a g s l m o

t r s r f g t a l i

m q d o u h u i r d

l q h m s o t f g a

g f t q r a h d o i

u s l m h a d u g o

i f l t q r m s r f

a l m q g t h d u s

Total: _____

Fluency CBM
Block 1 Form 13

s q r i h a u l f d

m t g o o g q t d m

f l r i h s u a h r

u l t s f a m i d o

q g o h f m t i a r

l q u g d s f i o r

l u a g d q t s h m

i q g r h s a m t o

u f l d l q o t u a

i h s f r m g d o g

h m f t h i q a r u

Total: _____

Fluency CBM
Block 1 Form 14

o d i m q s g r t h

l a q f r a t s h l

f u o i d g m q o f

g u m i g d r a s q

l t l f r u m h q t

g o d i a s h f d a

q l u m o t g r i s

h i l q m t r u s g

a d f l q h s a d o

i f m t r u g h r f

l m q s o u i a t g

Total: _____

Fluency CBM
Block 1 Form 15

t a r d i h s l f o

u m q g o d a t u h

f r s l i g m q m a

u t r f o g s l d q

i h f i s d a o g h

q r t u l m h m g u

o a r t d q s f i l

r h m g d o f u l i

t a s q t q f g r m

i d h l a o u s r d

t h q m g i l a u o

Total: _____

Fluency CBM
Block 2 Form 1

b	k	w	v	e	n	L	c	T	M
y	p	j	F	M	F	e	c	k	L
y	p	n	b	j	v	w	T	w	c
p	T	v	k	L	F	j	n	M	y
e	b	j	e	y	k	p	c	M	F
T	b	w	L	v	n	T	b	p	w
c	M	L	F	n	j	e	v	y	k
e	v	M	p	j	k	F	w	b	T
y	n	L	c	n	M	v	b	T	c
L	e	j	y	p	k	w	F	L	j
n	y	v	c	T	b	F	e	w	k

Total: _____

Fluency CBM
Block 2 Form 2

y	e	p	e	c	b	k	L	b	M
F	k	j	T	b	y	p	k	L	F
j	c	b	k	M	T	e	e	p	M
k	L	k	e	y	j	T	e	b	c
F	b	p	j	w	L	T	y	M	k
e	F	k	c	b	b	p	v	L	F
e	b	b	T	j	M	w	y	k	c
w	k	j	c	M	T	v	p	b	e
y	b	F	L	e	F	T	w	j	b
M	p	c	L	v	b	y	k	b	e
v	L	p	M	k	j	b	T	b	v

Total: _____

Fluency CBM
Block 2 Form 3

k	j	M	w	T	v	e	p	c	F
n	L	y	b	c	T	e	p	M	k
j	n	v	w	y	L	b	j	M	v
F	e	b	y	L	n	T	c	w	p
M	F	w	L	e	c	p	b	T	v
y	j	n	k	T	L	k	F	c	j
v	n	b	M	p	e	w	y	j	L
y	v	T	b	k	M	e	n	w	p
F	c	M	L	w	v	k	F	T	b
p	j	n	y	c	e	c	p	k	T
b	n	L	e	F	w	j	y	v	M

Total: _____

Fluency CBM
Block 2 Form 4

c p k T b n L e F w

j y v M M e w p k y

T c v b L F j n c v

b F w k n T j p y e

M L e w T v L b y M

F n k p c j c j M p

L F y T e n k v w p

w k F L j T b n e v

M c y c e j L F w y

T k v p M b n L n w

y F e b p T v c j k

Total: _____

Fluency CBM
Block 2 Form 5

j	w	b	n	F	L	e	v	M	c
T	y	p	k	p	F	M	n	w	T
e	L	F	y	j	c	k	b	v	T
e	c	j	M	n	v	p	F	b	k
L	w	v	p	L	M	n	k	F	y
M	y	n	e	c	p	v	c	n	k
w	b	e	j	T	c	p	j	e	y
L	n	w	k	v	F	M	T	b	c
T	M	k	w	b	p	j	v	n	L
F	e	F	c	p	y	n	e	w	v
b	M	k	F	L	T	c	j	L	y

Total: _____

Fluency CBM
Block 2 Form 6

v	k	w	L	y	T	p	e	n	F
M	b	j	c	y	T	p	v	w	L
j	c	n	e	F	M	k	j	w	n
b	k	T	F	c	e	v	L	p	M
y	v	k	b	w	e	y	M	c	T
L	n	j	F	p	F	y	c	w	k
n	p	v	M	e	b	T	L	j	v
L	n	w	k	v	F	M	T	b	c
T	M	k	w	b	p	j	v	n	L
F	e	F	c	p	y	n	e	w	v
b	M	k	F	L	T	c	j	L	y

Total: _____

Fluency CBM
Block 2 Form 7

b	p	F	T	k	j	c	e	y	M
n	w	L	v	F	c	y	n	M	L
e	j	v	b	w	k	T	p	j	L
c	y	e	k	b	F	v	n	p	T
M	w	j	n	k	e	p	b	M	L
c	v	F	w	T	y	k	v	T	F
c	M	p	w	L	j	e	n	y	b
v	L	k	c	y	n	p	F	e	M
w	j	T	b	n	k	y	M	b	F
j	v	e	p	T	c	L	w	v	e
b	w	L	F	M	n	T	y	c	k

Total: _____

Fluency CBM
Block 2 Form 8

k	T	p	L	c	e	w	b	n	M
v	j	y	F	L	e	c	k	y	v
j	M	T	b	w	p	n	F	F	b
p	M	w	n	L	k	T	v	y	c
c	w	F	y	L	k	j	y	M	c
k	e	F	v	n	p	b	L	T	w
n	k	L	F	M	e	p	c	v	y
j	b	w	T	M	p	j	c	k	e
L	b	F	T	n	y	v	w	y	L
v	p	F	b	j	M	n	w	e	T
k	c	k	L	c	w	y	e	n	p

Total: _____

Fluency CBM
Block 2 Form 9

k	T	p	L	c	e	w	b	n	M
v	j	y	F	L	e	c	k	y	v
j	M	T	b	w	p	n	F	F	b
p	M	w	n	L	k	T	F	y	c
c	w	F	y	L	k	j	y	M	c
k	e	F	v	n	p	b	L	T	w
n	k	L	F	M	e	p	c	v	y
j	b	w	T	M	p	j	c	k	e
L	b	F	T	n	y	v	w	y	L
v	p	F	b	j	M	n	w	e	T
k	c	M	k	c	w	y	e	n	p

Total: _____

Fluency CBM
Block 2 Form 10

j	M	e	T	k	p	c	v	n	y
b	w	F	L	b	w	j	p	v	y
k	L	T	F	M	e	n	c	v	T
L	F	M	p	j	w	b	y	n	e
k	c	L	v	M	F	y	p	j	c
b	e	k	n	w	T	F	k	p	j
e	L	M	w	c	b	T	v	n	y
F	n	p	L	c	e	y	T	k	w
M	j	v	b	j	n	k	F	T	p
w	e	y	L	v	c	b	M	k	F
j	T	y	b	L	v	c	n	e	L

Total: _____

Fluency CBM
Block 2 Form 11

M	j	T	k	v	p	e	w	n	F
L	b	y	c	F	k	v	c	j	w
T	e	M	n	p	w	y	L	p	w
b	k	e	y	L	T	F	v	M	c
j	n	c	w	y	j	L	F	e	n
p	b	v	T	M	k	p	y	b	c
F	w	L	T	e	v	M	j	n	T
k	y	n	c	b	v	M	L	e	j
w	F	M	F	y	T	p	n	v	k
M	c	e	w	b	j	L	e	y	T
p	L	F	v	k	M	c	n	b	w

Total: _____

Fluency CBM
Block 2 Form 12

v	L	n	j	k	F	y	c	e	p
M	w	T	b	y	b	T	v	y	b
n	M	j	w	k	L	c	e	e	k
v	j	n	F	b	c	y	w	p	L
M	T	j	T	L	b	p	w	y	c
F	e	n	M	k	v	F	y	L	c
n	w	T	v	j	p	e	M	k	b
T	e	v	k	p	F	b	L	c	j
M	w	y	n	j	n	e	p	k	w
T	M	F	b	c	y	v	L	F	p
y	M	b	w	v	c	e	n	L	T

Total: _____

Fluency CBM
Block 2 Form 13

b	p	j	F	v	L	e	n	c	p
y	T	k	w	k	M	j	T	n	e
F	b	p	c	L	w	v	y	w	p
T	b	e	k	n	L	j	y	v	F
M	c	M	n	w	k	e	F	T	p
L	j	b	v	y	c	F	L	M	T
e	k	w	y	v	b	j	c	n	p
y	M	v	e	F	j	p	L	c	k
n	T	w	b	T	n	y	j	k	w
e	p	L	b	v	M	c	F	j	w
T	L	y	e	k	c	n	F	b	M

Total: _____

Fluency CBM
Block 2 Form 14

b	v	p	w	F	y	j	k	L	T
e	c	n	M	k	b	j	v	L	p
T	M	e	c	n	y	w	F	p	w
c	v	y	k	L	j	F	T	b	e
n	M	j	c	L	T	e	y	w	n
k	v	p	M	F	b	T	M	b	v
p	L	n	w	c	j	F	e	k	y
p	e	T	L	v	k	M	w	y	n
F	j	b	c	b	c	e	w	v	M
L	y	j	T	k	n	F	p	y	b
p	c	w	n	F	k	L	M	j	T

Total: _____

Fluency CBM
Block 2 Form 15

T p j y n L k b c v

M w e F j c n b F k

e T M w p L v y e c

b w F y v M j L T k

n p e w b M y p j c

n T v F L k c F j y

e T L w k M v n p b

F p n j y T M e v w

L k c b j M F p L e

w y k n T c v b b j

M y v F T p w c e k

Total: _____

Fluency CBM
Block 3 Form 1

Q	D	N	x	R	I	J	A	H	G
B	z	E	D	A	B	Q	x	E	J
I	G	z	R	H	N	H	E	I	N
G	R	D	Q	x	z	B	J	A	E
D	x	J	A	B	N	z	G	Q	R
H	I	Q	A	D	R	N	B	I	G
J	z	x	E	H	B	E	I	H	A
N	D	x	R	G	Q	z	J	x	z
D	Q	J	I	R	N	E	H	B	A
G	A	Q	B	R	J	E	z	N	I
H	D	G	x	R	I	E	H	G	A

Total: _____

Fluency CBM
Block 3 Form 2

R	Q	D	G	E	N	H	A	I	x
B	J	J	I	A	D	B	H	G	R
z	Q	x	N	E	D	G	N	A	I
H	R	B	x	Q	J	E	A	Q	J
D	H	z	x	I	R	B	G	E	N
Q	x	B	E	D	J	I	G	A	z
z	H	N	D	I	A	N	R	z	E
Q	H	J	x	G	B	N	J	E	D
A	B	z	R	H	G	I	Q	x	A
J	R	x	E	N	z	Q	D	H	B
G	I	z	I	E	x	H	J	D	G

Total: _____

Fluency CBM
Block 3 Form 3

I	z	A	B	N	x	J	D	R	G
E	Q	H	G	Q	A	N	I	J	H
z	E	D	R	B	x	J	x	z	Q
N	A	B	G	H	E	D	I	R	H
I	R	Q	x	N	B	D	J	z	A
E	G	E	Q	R	D	B	H	J	A
I	z	N	G	x	Q	G	B	E	I
D	J	A	N	x	H	z	D	x	E
R	H	z	Q	B	G	J	A	I	A
G	R	E	N	H	z	I	Q	J	D
B	x	x	R	E	A	H	N	D	Q

Total: _____

Fluency CBM
Block 3 Form 4

z	R	E	x	B	A	J	Q	I	G
D	N	J	I	E	N	z	x	D	R
A	B	G	H	Q	N	H	E	B	x
D	A	Q	G	I	z	J	R	A	I
R	D	x	z	E	J	Q	N	G	B
H	x	G	J	A	I	z	D	H	R
Q	E	B	N	E	Q	B	D	A	z
J	R	I	N	G	x	H	B	z	E
I	R	Q	J	N	D	x	H	A	G
z	x	J	A	H	R	B	I	N	Q
E	D	D	B	Q	G	x	I	H	z

Total: _____

Fluency CBM
Block 3 Form 5

D	B	Q	G	x	I	H	z	R	E
J	N	A	A	B	N	R	I	J	G
D	Q	H	z	x	H	I	z	J	D
R	E	A	x	N	Q	B	G	D	J
Q	I	H	N	R	G	B	x	A	E
z	x	A	z	Q	I	N	G	H	B
R	J	D	E	Q	A	H	z	E	D
B	R	G	J	x	I	N	N	D	I
B	A	E	R	z	J	x	G	Q	H
B	A	J	Q	D	R	E	z	H	N
x	I	E	R	z	B	J	G	I	N

Total: _____

Fluency CBM
Block 3 Form 6

J	H	D	N	x	A	z	Q	B	R
I	G	J	B	I	D	H	R	z	E
N	Q	G	x	A	H	N	Q	G	x
R	J	A	I	B	D	E	z	H	A
G	B	N	D	z	Q	E	x	I	J
R	H	z	x	N	G	A	Q	R	E
I	D	J	B	G	B	I	z	R	E
x	D	N	J	H	A	Q	E	A	G
H	J	x	D	Q	I	N	z	B	R
H	E	z	I	A	R	G	Q	N	D
J	B	x	N	Q	D	H	A	z	E

Total: _____

Fluency CBM
Block 3 Form 7

N	Q	D	H	A	z	E	R	B	x
J	B	I	z	D	H	Q	x	B	N
E	A	I	J	R	G	B	E	N	J
z	A	H	Q	x	G	R	D	x	J
J	z	A	I	B	H	Q	N	E	G
R	Q	R	G	x	N	A	J	z	E
I	D	H	B	R	N	E	D	I	z
x	Q	G	B	H	A	J	B	x	A
J	H	G	Q	D	z	E	N	R	I
H	R	B	J	G	z	x	I	Q	N
A	D	E	x	J	A	I	Q	E	D

Total: _____

Fluency CBM
Block 3 Form 8

D	z	G	R	N	B	H	D	Q	G
z	I	J	E	R	x	N	B	H	A
I	G	E	B	Q	H	D	R	x	J
A	z	N	z	N	G	B	Q	D	I
E	J	A	H	x	G	R	I	z	D
N	A	x	B	H	Q	E	J	J	z
Q	D	I	B	N	H	E	R	A	x
G	N	A	E	I	B	J	G	z	x
R	Q	D	H	x	z	E	J	D	N
H	A	B	R	I	Q	G	D	G	Q
J	E	A	H	I	B	R	N	z	x

Total: _____

Fluency CBM
Block 3 Form 9

J	A	Q	G	H	D	B	E	R	N
E	I	x	I	J	D	E	E	H	Q
G	N	A	R	B	x	J	A	x	B
x	G	E	R	H	D	I	Q	N	H
D	G	A	B	x	E	R	z	J	I
x	z	N	Q	B	D	H	R	E	I
G	A	J	G	R	H	D	B	N	I
A	z	E	Q	J	x	A	D	Q	B
R	Q	D	H	x	z	E	J	D	N
H	A	B	R	I	Q	G	D	G	Q
J	E	A	H	I	B	R	N	z	x

Total: _____

Fluency CBM
Block 3 Form 10

A	D	Q	B	z	E	x	R	J	I
G	H	N	J	D	G	A	N	z	Q
I	x	H	E	B	R	I	J	E	z
R	N	A	B	Q	G	x	H	D	E
G	A	D	R	J	Q	I	N	z	x
H	B	E	G	A	D	R	J	Q	I
N	z	x	H	B	D	I	J	Q	z
B	E	R	N	x	G	A	H	Q	N
G	E	A	D	J	I	H	R	x	z
B	z	H	Q	D	x	J	E	I	G
N	B	A	R	N	J	D	H	Q	I

Total: _____

Fluency CBM
Block 3 Form 11

R	I	A	N	J	B	Q	z	E	H
D	x	G	z	I	N	R	E	H	x
A	D	G	Q	J	B	H	A	Q	R
z	J	E	N	D	I	B	x	G	B
G	A	E	x	R	D	I	J	N	H
z	Q	G	R	I	A	D	J	B	R
N	H	x	z	E	D	Q	J	H	R
A	I	z	N	B	x	G	Q	x	R
B	H	D	N	E	G	I	z	A	J
G	J	E	Q	z	H	R	D	B	x
A	N	I	I	B	G	H	D	R	E

Total: _____

Fluency CBM
Block 3 Form 12

E	x	Q	A	z	J	N	J	A	N
D	I	Q	x	R	z	G	H	B	E
Q	G	x	z	J	E	G	B	H	D
A	I	N	A	R	J	D	I	H	E
B	Q	G	x	N	z	B	x	G	I
Q	N	R	J	D	A	E	H	H	D
J	R	I	E	B	G	A	N	z	Q
x	J	E	I	Q	x	N	G	R	B
D	A	z	H	B	x	G	Q	J	D
H	E	A	N	G	I	z	D	R	J
Q	N	A	x	I	B	H	z	E	G

Total: _____

Fluency CBM
Block 3 Form 13

B	H	z	H	z	E	G	A	I	Q
E	H	R	z	D	x	G	J	B	N
z	x	Q	E	N	G	D	I	B	A
R	J	H	I	N	A	x	B	E	G
H	J	z	Q	R	D	x	N	Q	D
H	E	J	R	B	z	G	A	I	Q
E	x	A	z	G	D	N	I	J	R
H	B	I	B	G	D	z	H	R	E
J	A	x	N	Q	B	A	x	Q	G
N	R	J	D	E	H	I	z	G	x
I	R	Q	B	D	J	N	z	E	A

Total: _____

Fluency CBM
Block 3 Form 14

R	G	H	x	B	E	I	N	Q	z
J	E	J	A	N	z	R	G	D	Q
I	H	x	B	J	D	R	I	E	G
x	Q	N	H	z	A	B	J	z	E
A	x	I	N	H	Q	D	R	G	B
x	G	N	I	D	z	B	R	E	H
A	J	Q	Q	H	x	I	N	B	R
J	E	G	A	z	D	J	E	N	G
z	Q	A	D	x	H	R	I	B	H
R	D	A	B	E	N	I	x	z	G
Q	J	N	A	z	B	I	E	R	D

Total: _____

Fluency CBM
Block 3 Form 15

D	x	G	Q	H	G	I	R	B	A
J	H	N	Q	E	z	x	D	N	A
G	B	x	I	R	D	Q	z	E	H
J	G	Q	D	E	N	J	z	B	R
A	x	I	J	N	E	H	z	D	x
I	A	G	B	R	D	x	H	D	B
J	I	z	E	A	Q	N	G	R	x
H	Q	R	N	E	D	J	I	G	z
B	A	Q	J	R	B	G	A	E	z
D	H	I	N	x	z	I	A	R	E
D	Q	J	H	x	N	B	G	x	N

Total: _____

APPENDIX C

TREATMENT FIDELITY FORM

EXTENDED PRACTICE CONDITION

Treatment Fidelity Form
Extended Practice Condition

Date: _____/_____/_____ Session: _____Rater: _____

	Occurred	
Component	Yes	No
1. Fluency goal was selected for each extended practice session.		
2. Each extended practice session was 1-minute.		
3. Performance was reviewed after each extended practice session.		
4. Designated dosage of extended practice was completed each day.		
5. Performance line graph was reviewed each session/day.		

APPENDIX D

LESSON MATERIALS

BLOCK 1: LESSONS 1-5

LESSON 1 (amts)

LESSON 2 (ifdr)

LESSON 3 (ogl)

LESSON 4 (hug)

LESSON 5 CUMMULATIVE REVIEW

BLOCK 2: LESSONS 1-5

LESSON 1 (LMFc)

LESSON 2 (bnkv)

LESSON 3 (ewj)

LESSON 4 (pyT)

LESSON 5 CUMMULATIVE REVIEW

BLOCK 3: LESSONS 1-5

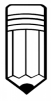
LESSON 1 (JQDI)

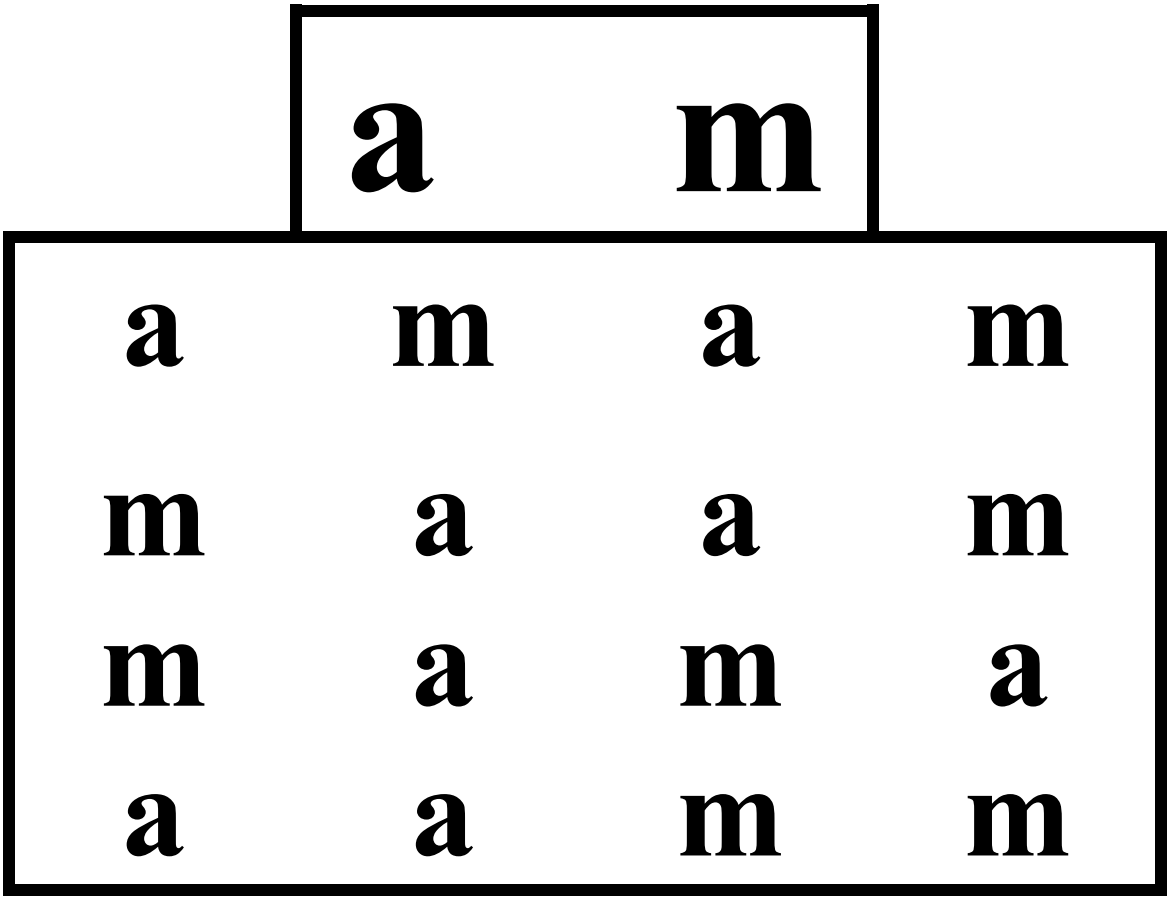
LESSON 2 (NAR)

LESSON 3 (EHG)

LESSON 4 (Bxz)

LESSON 5 CUMMULATIVE REVIEW

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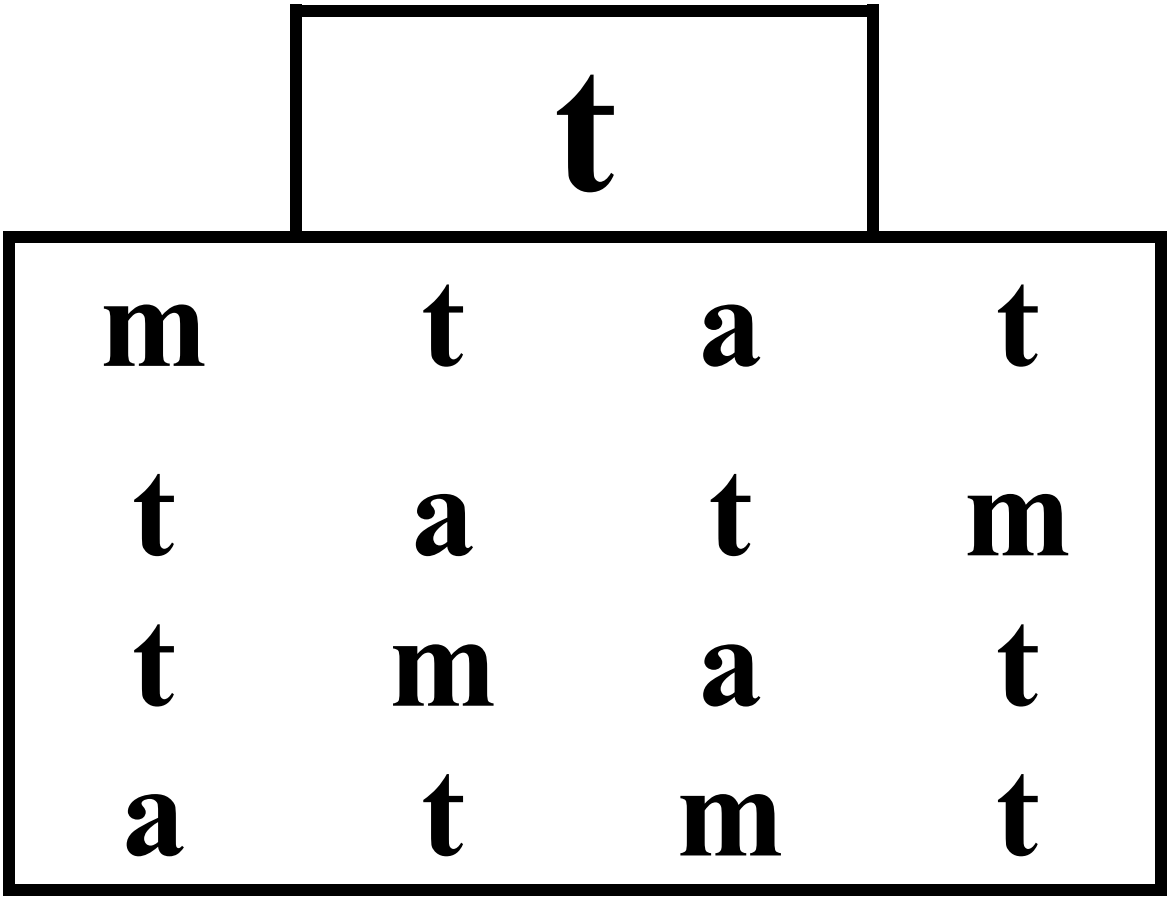
a a m m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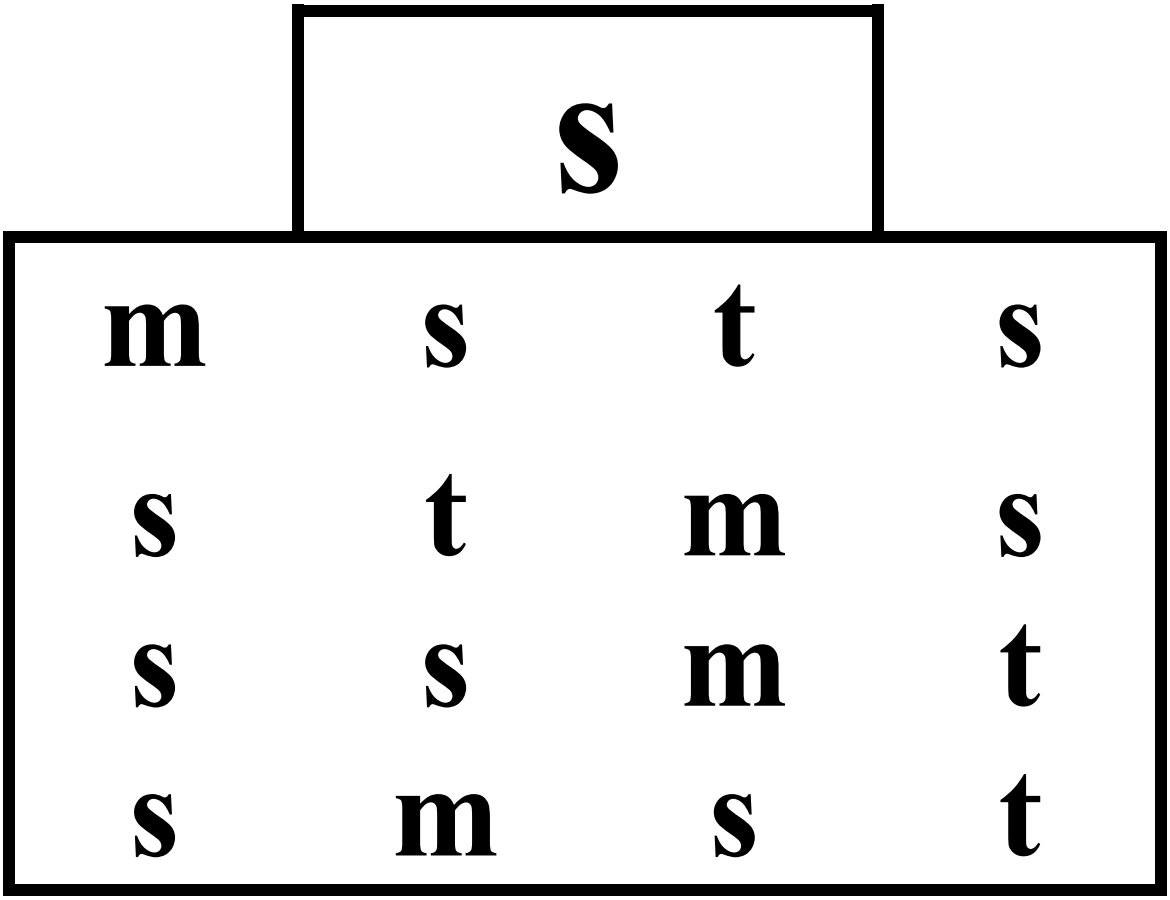
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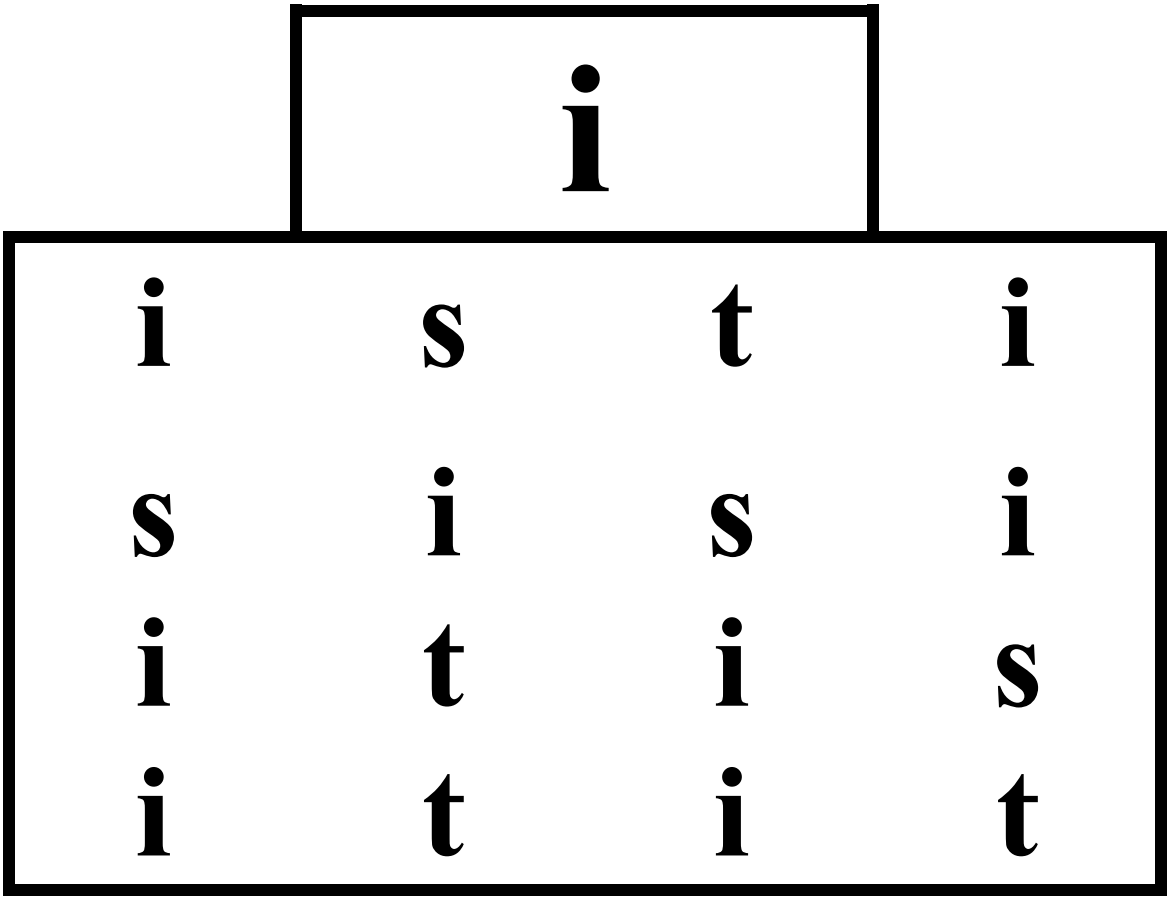

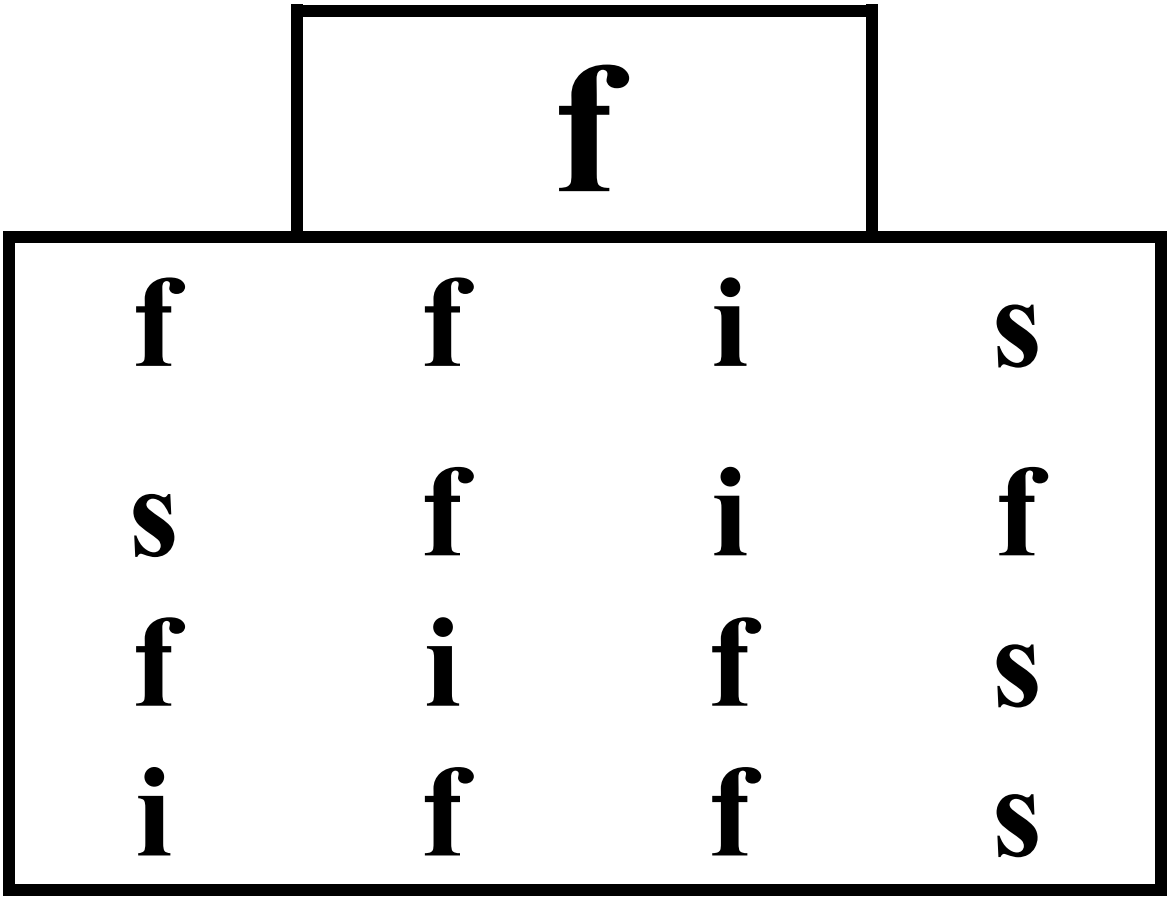
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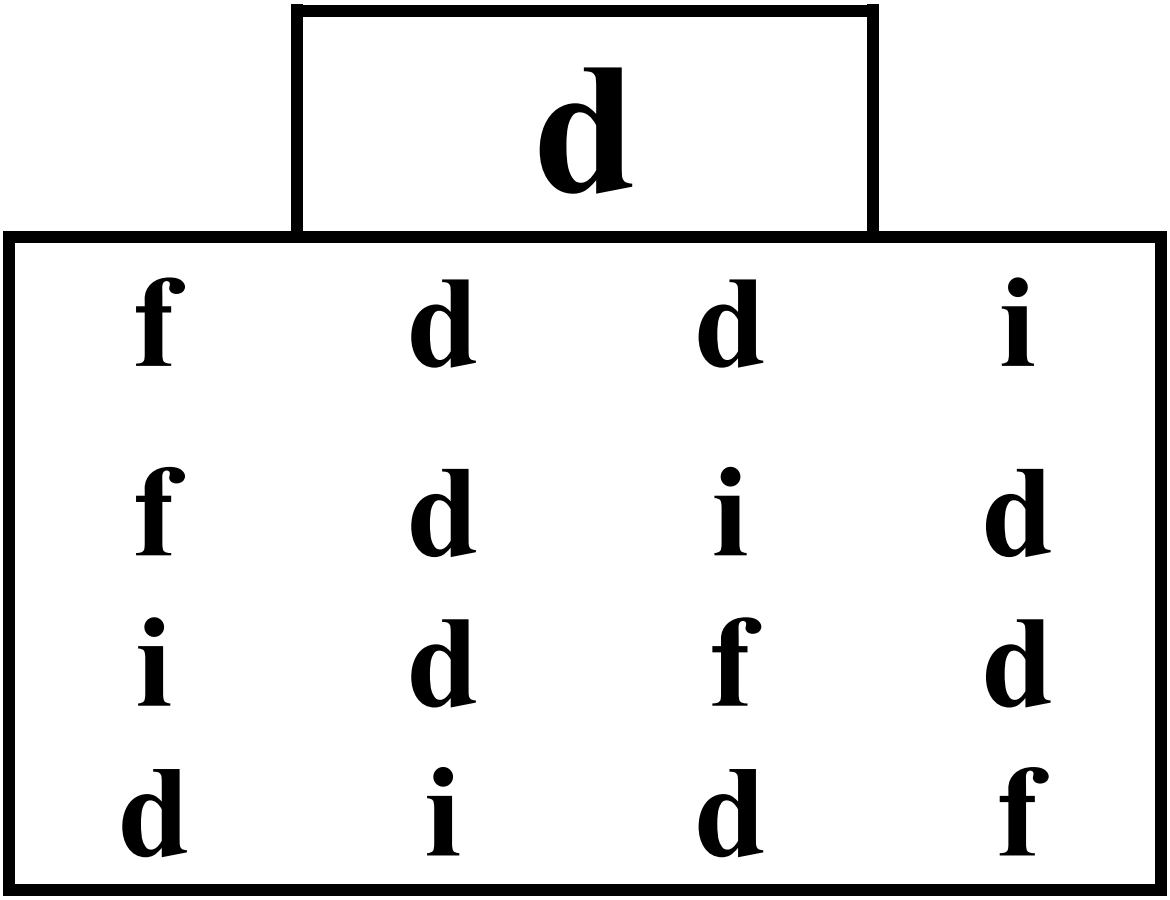
s f i f
f i f s
i f f s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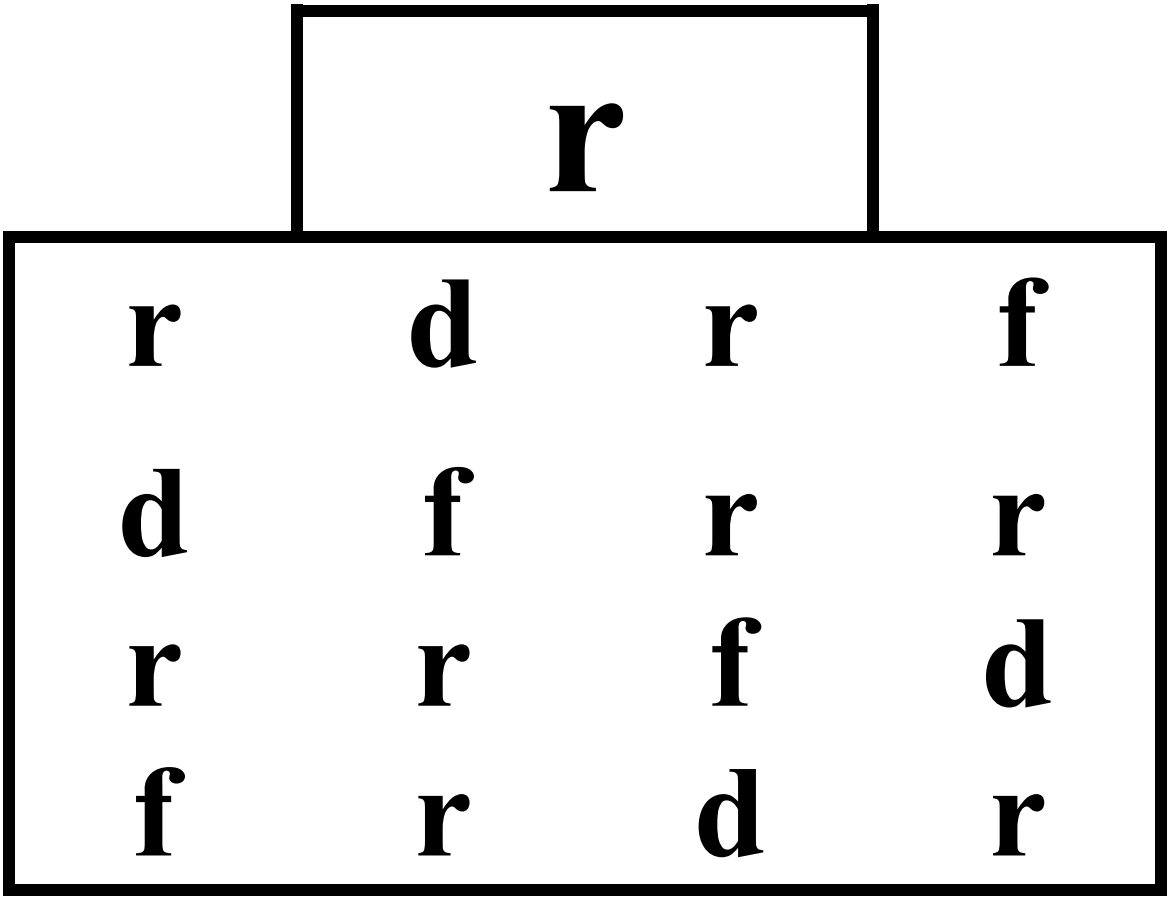
d i d f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i f d r

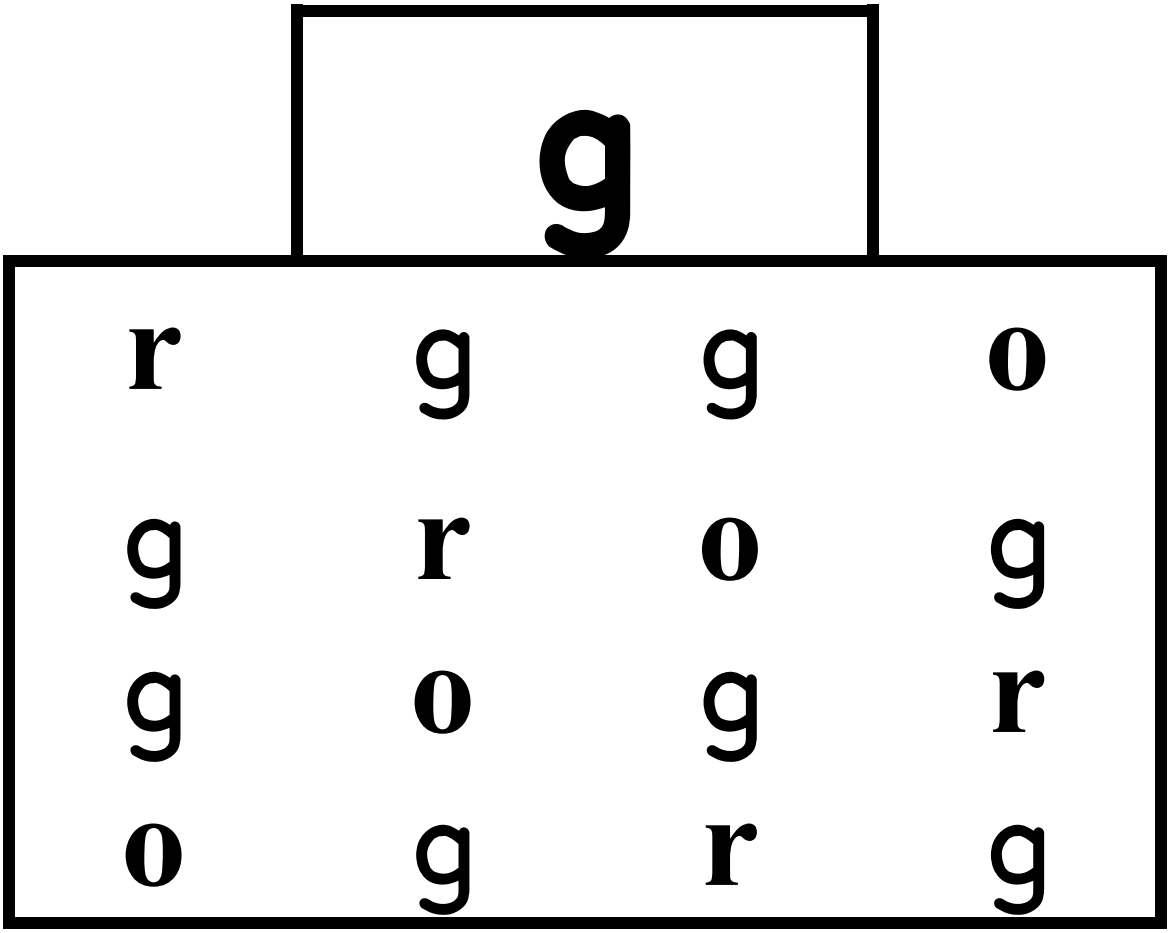
o

r o d o

o r o d

o d o r

d o r o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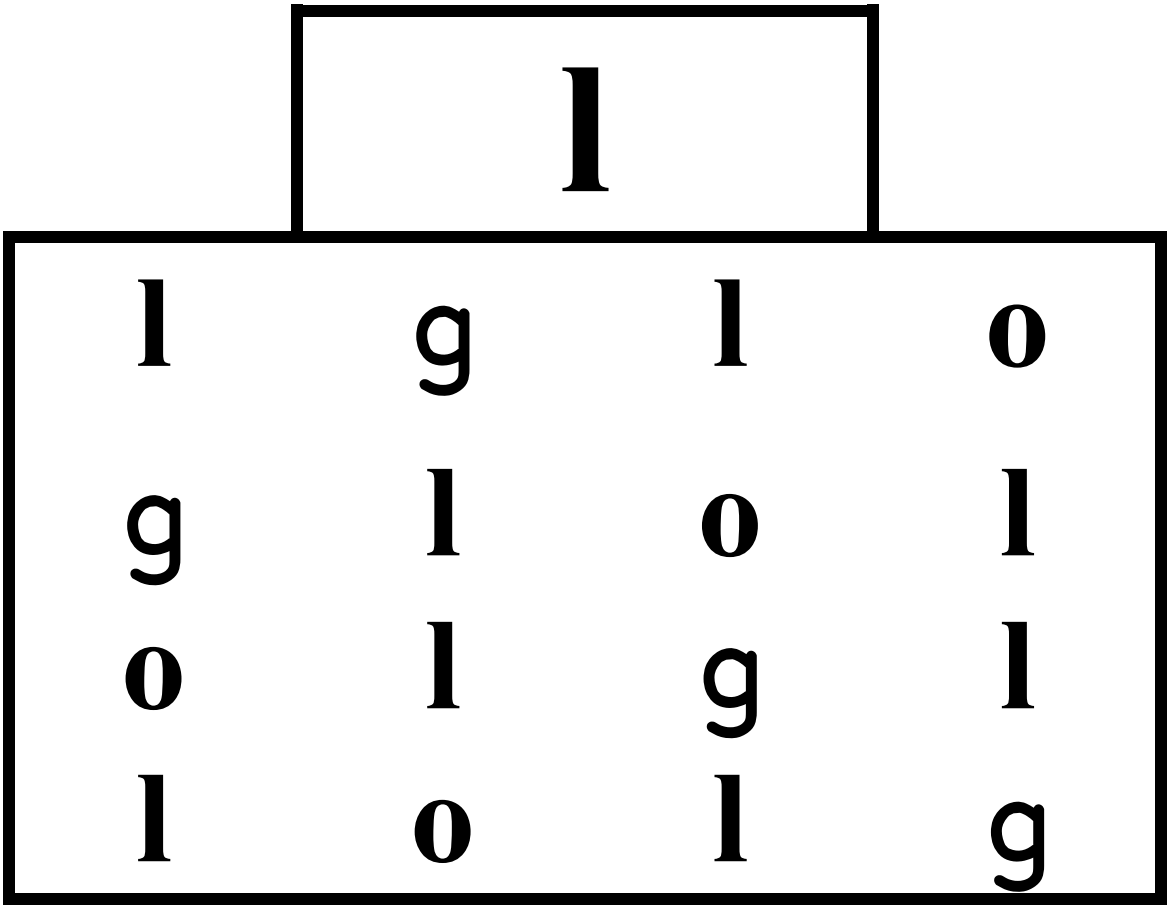
g r o g
g o g r
o g r g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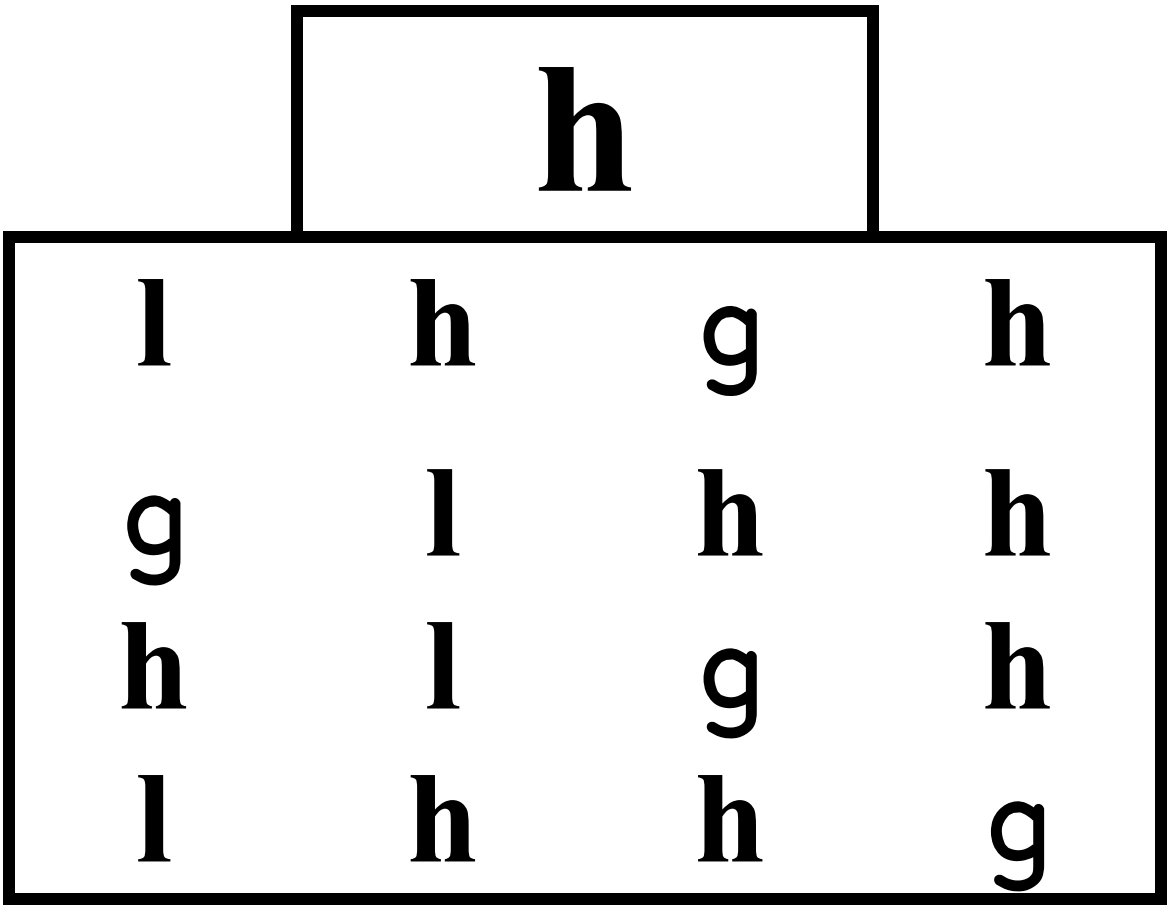
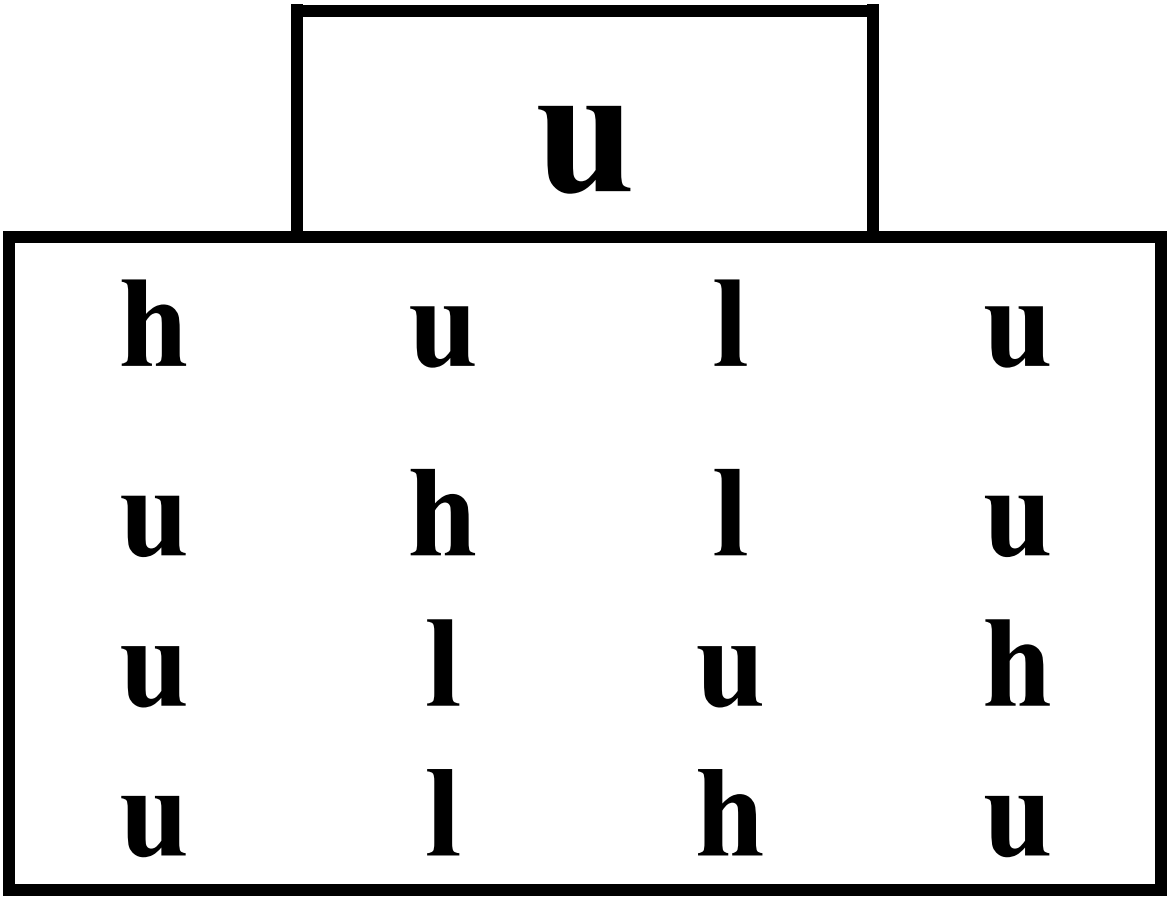
o l g l
l o l g

o g l

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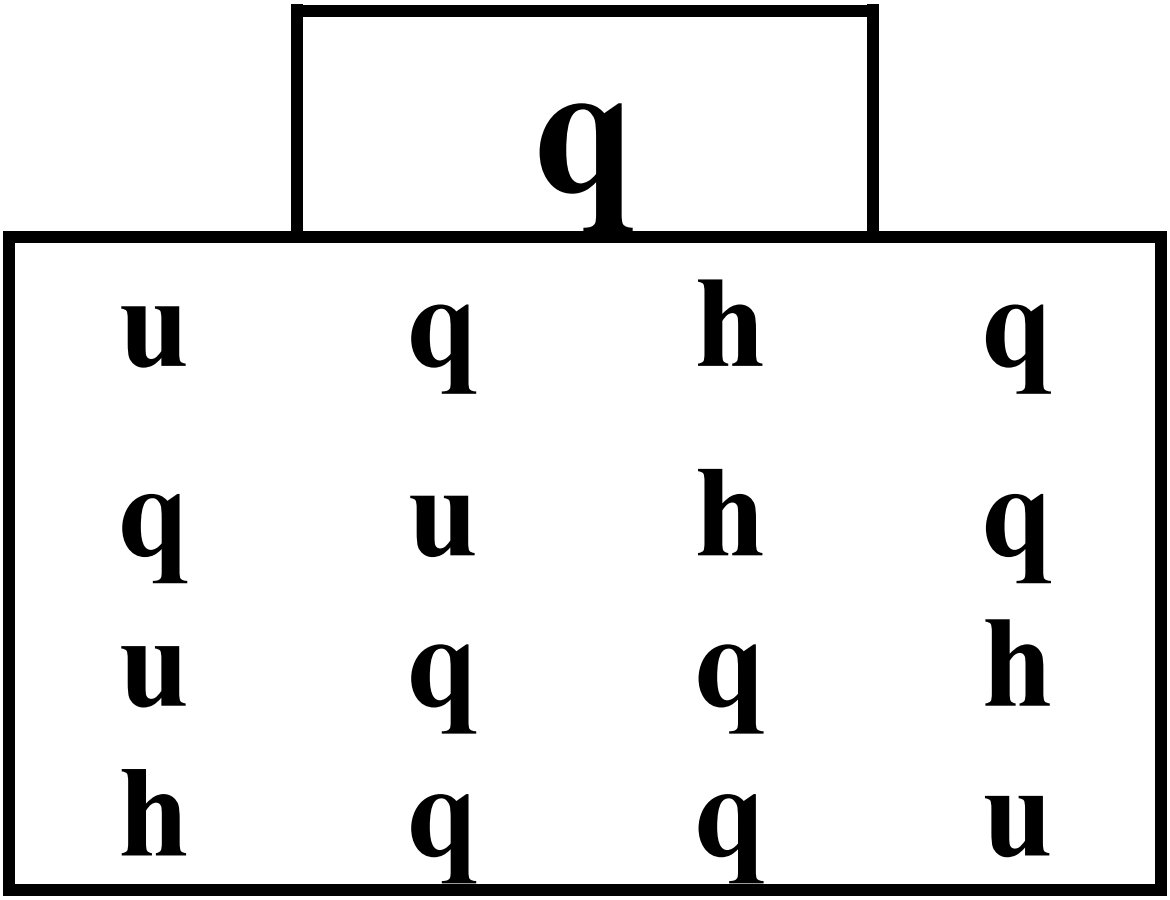
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u q q h
h q q u

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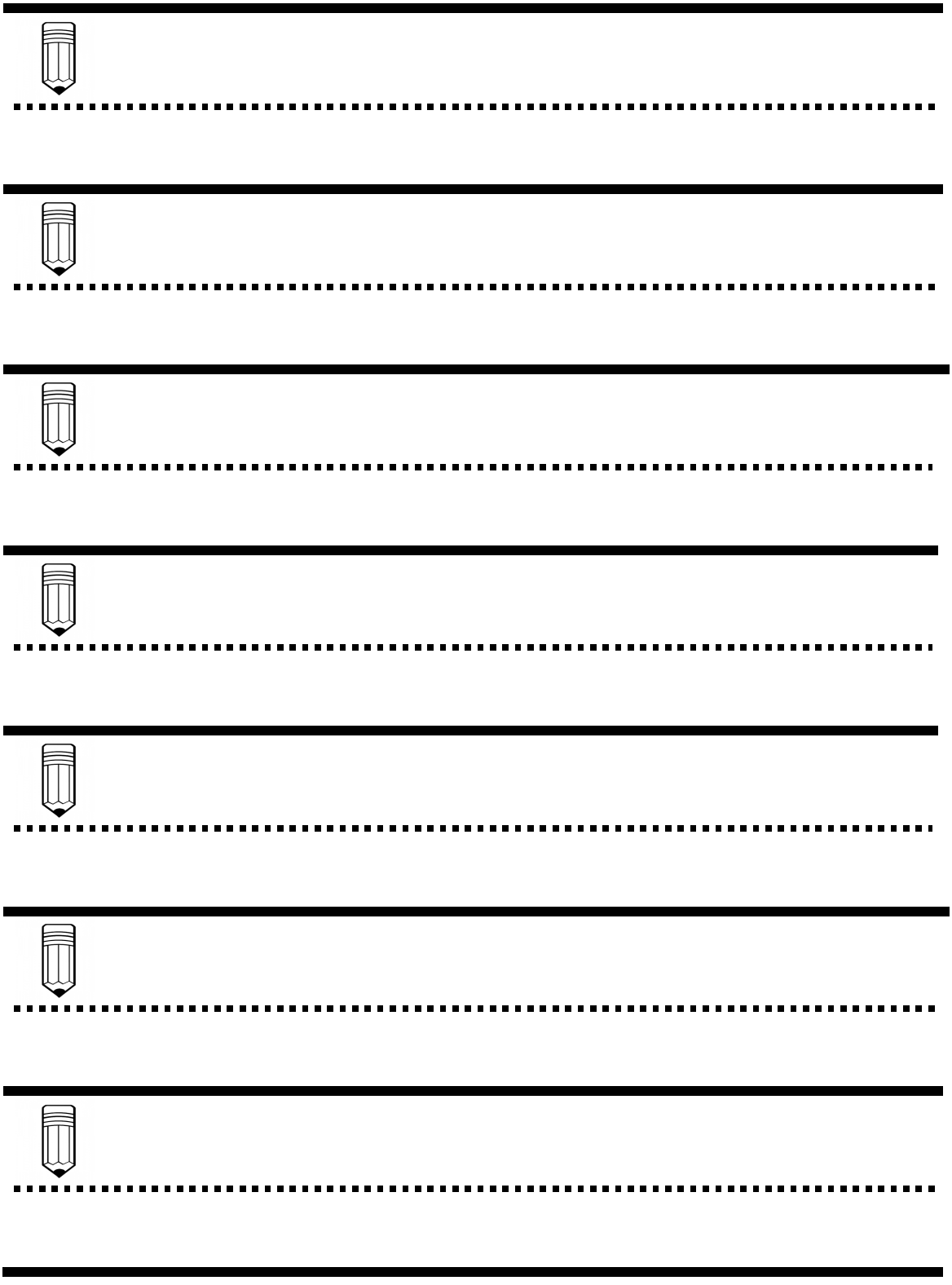

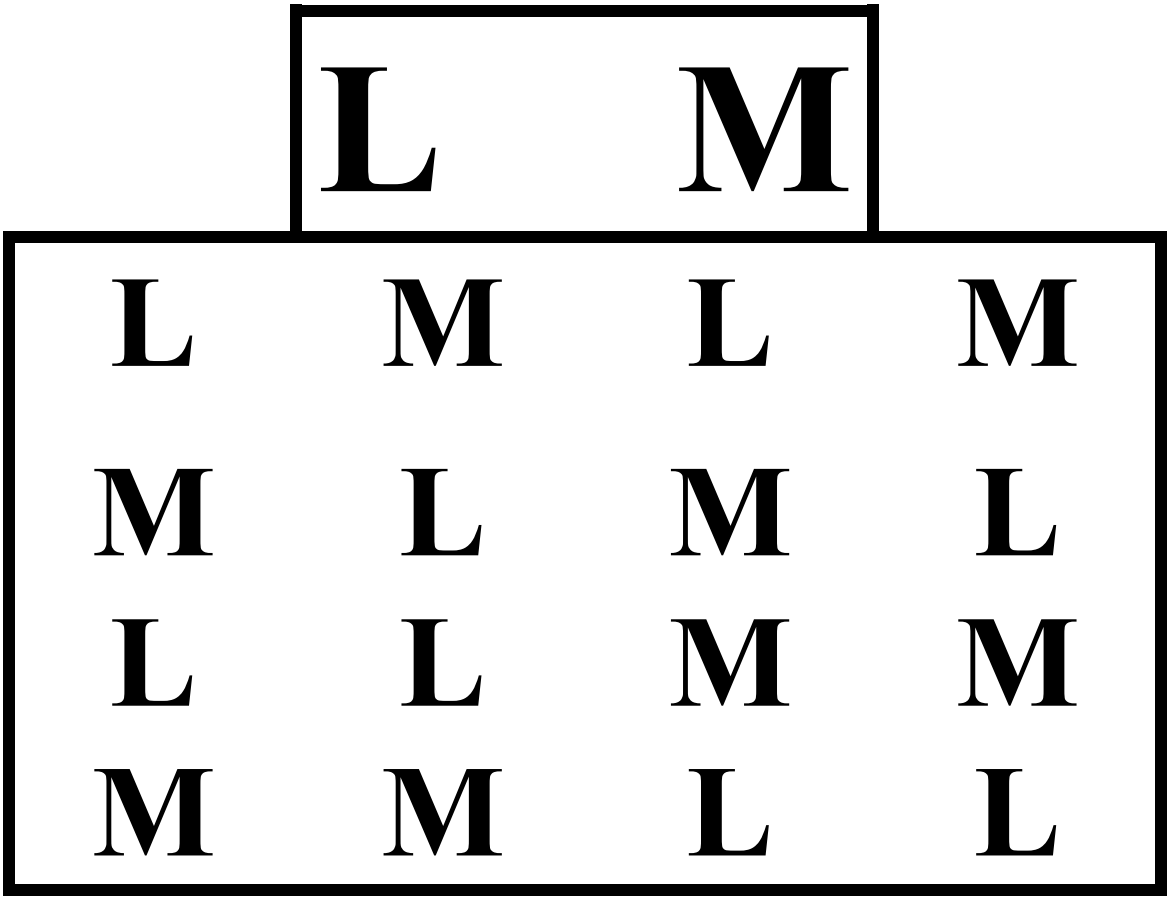
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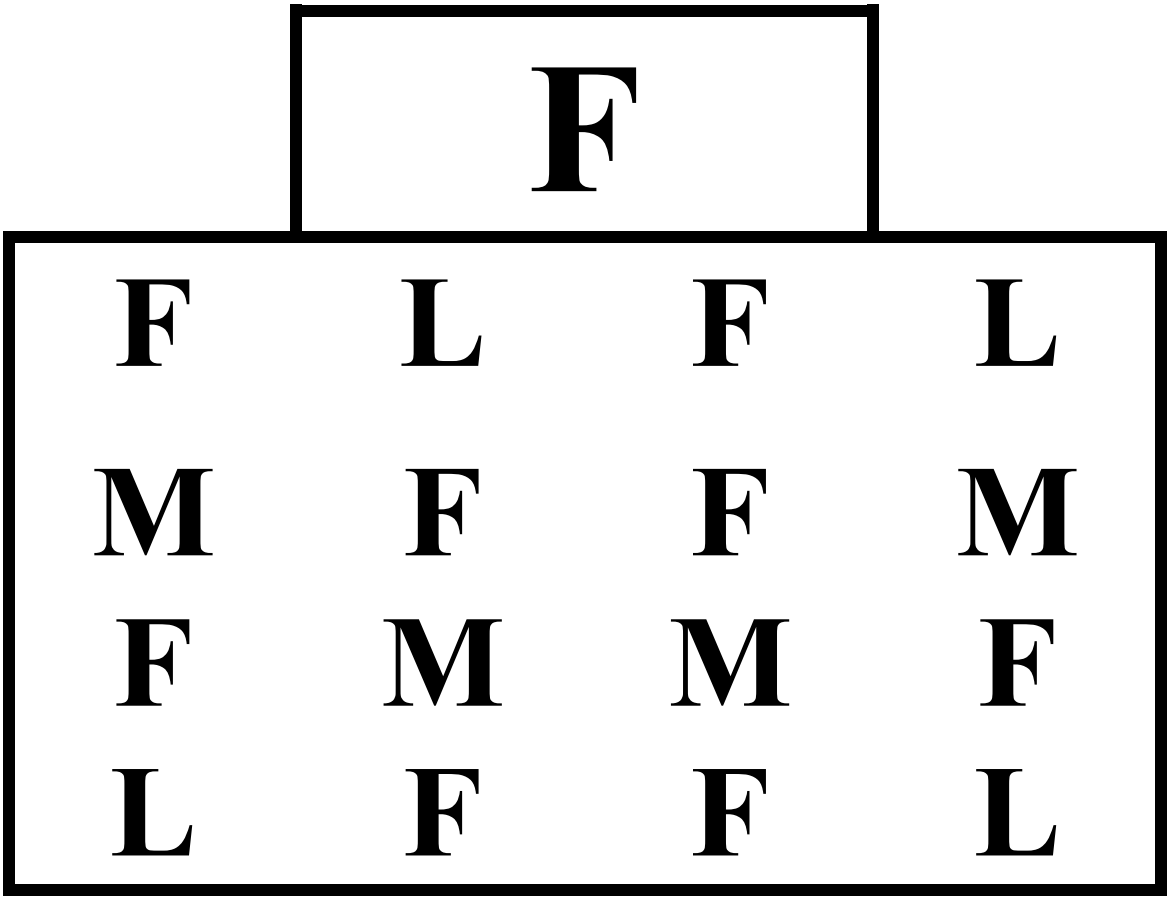
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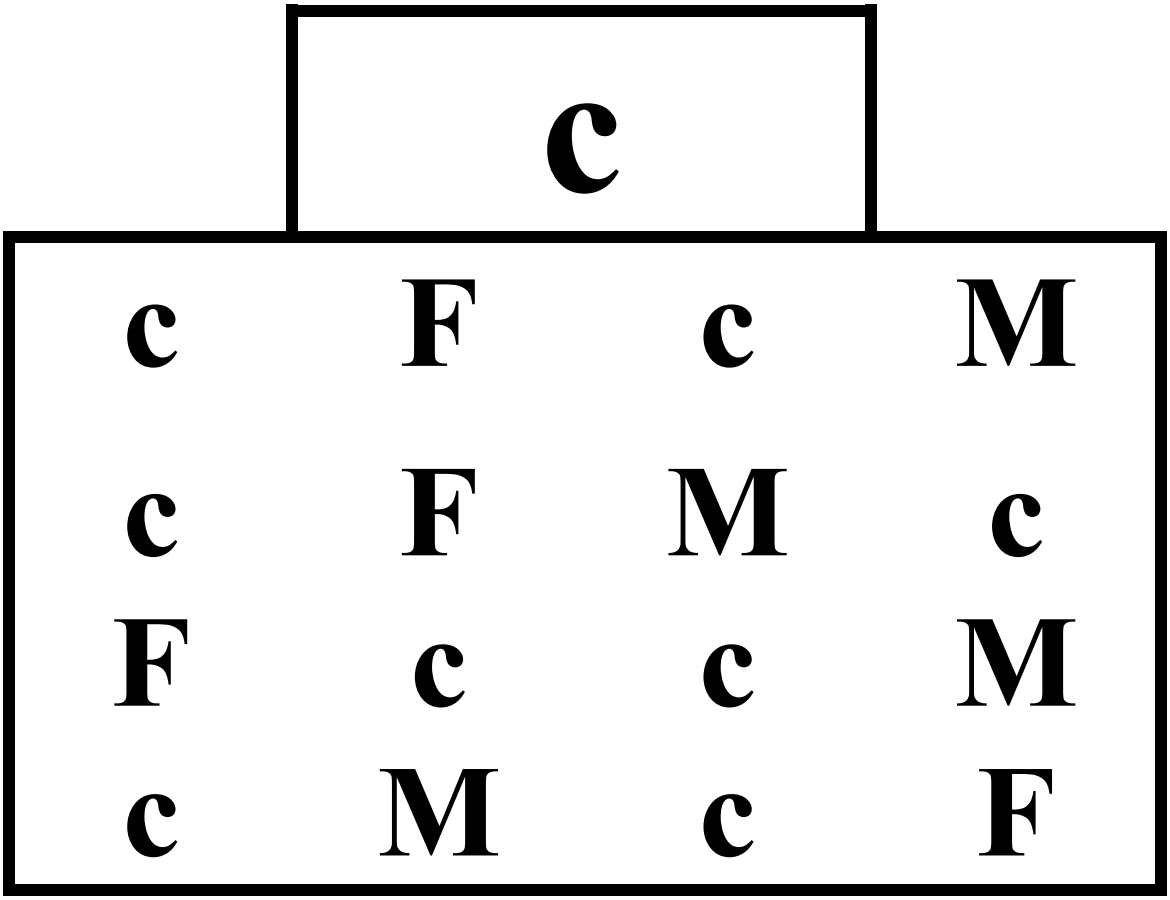
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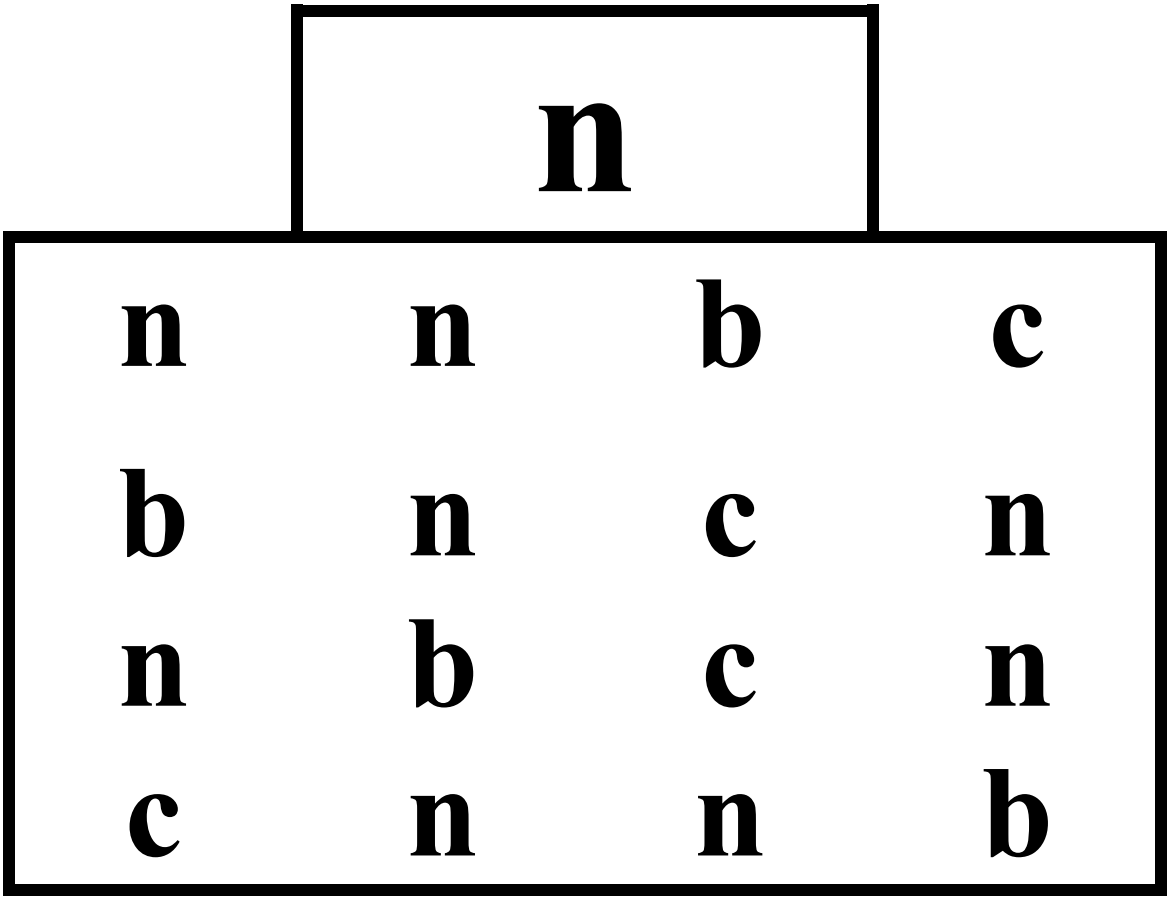
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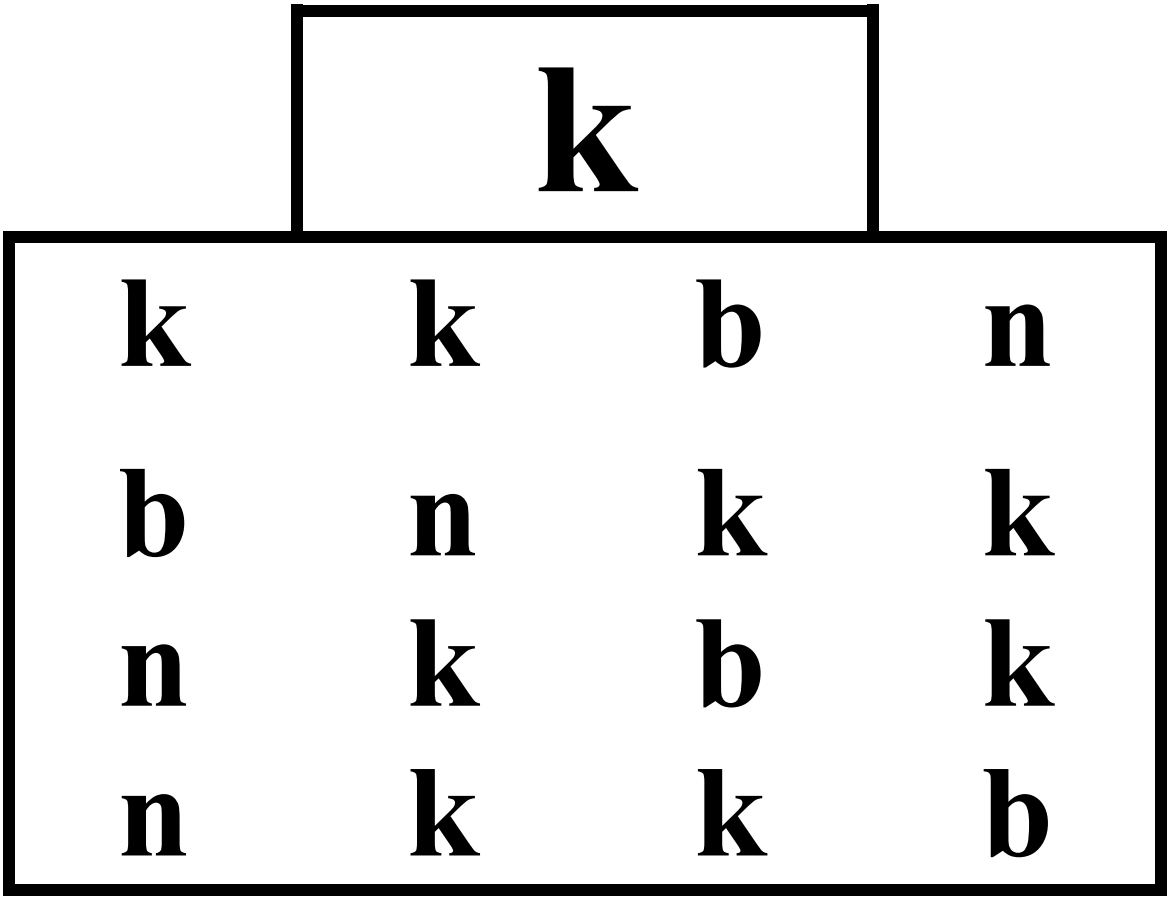
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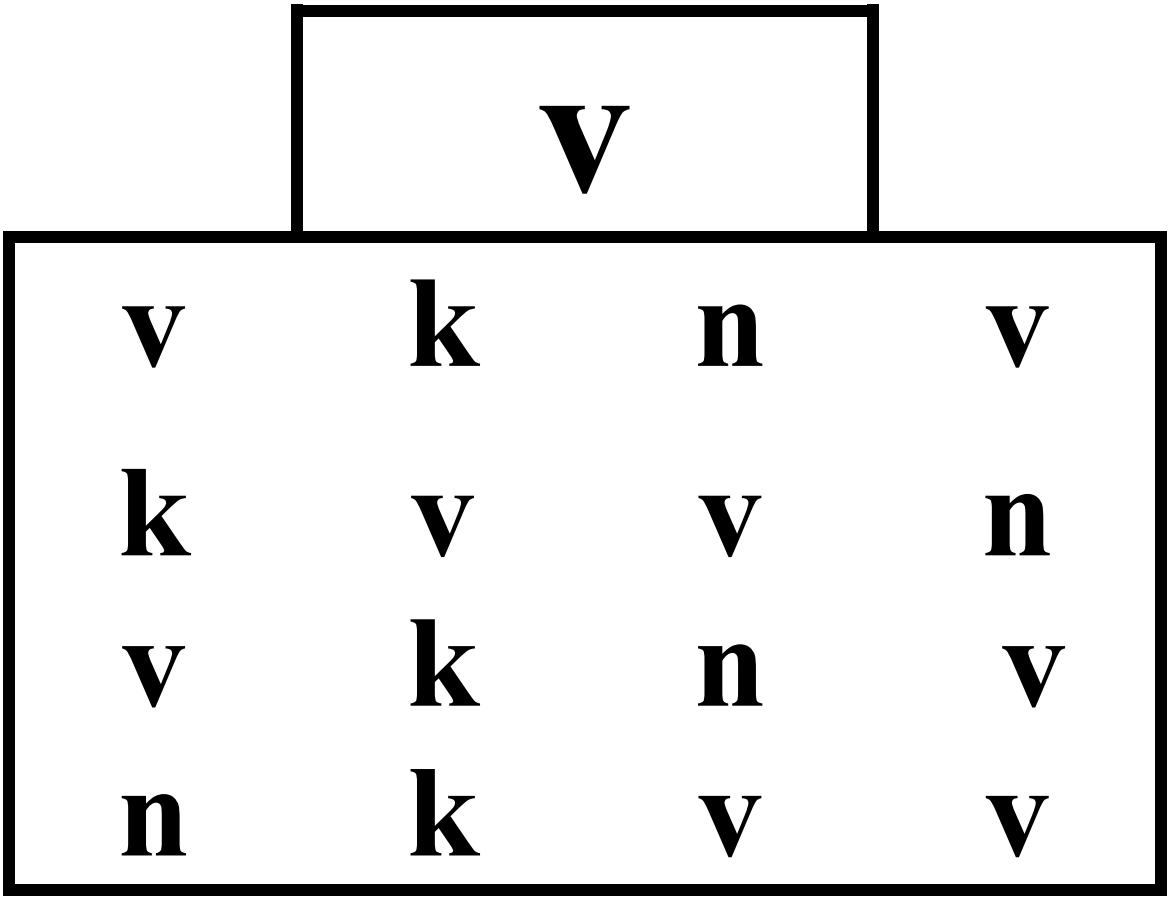
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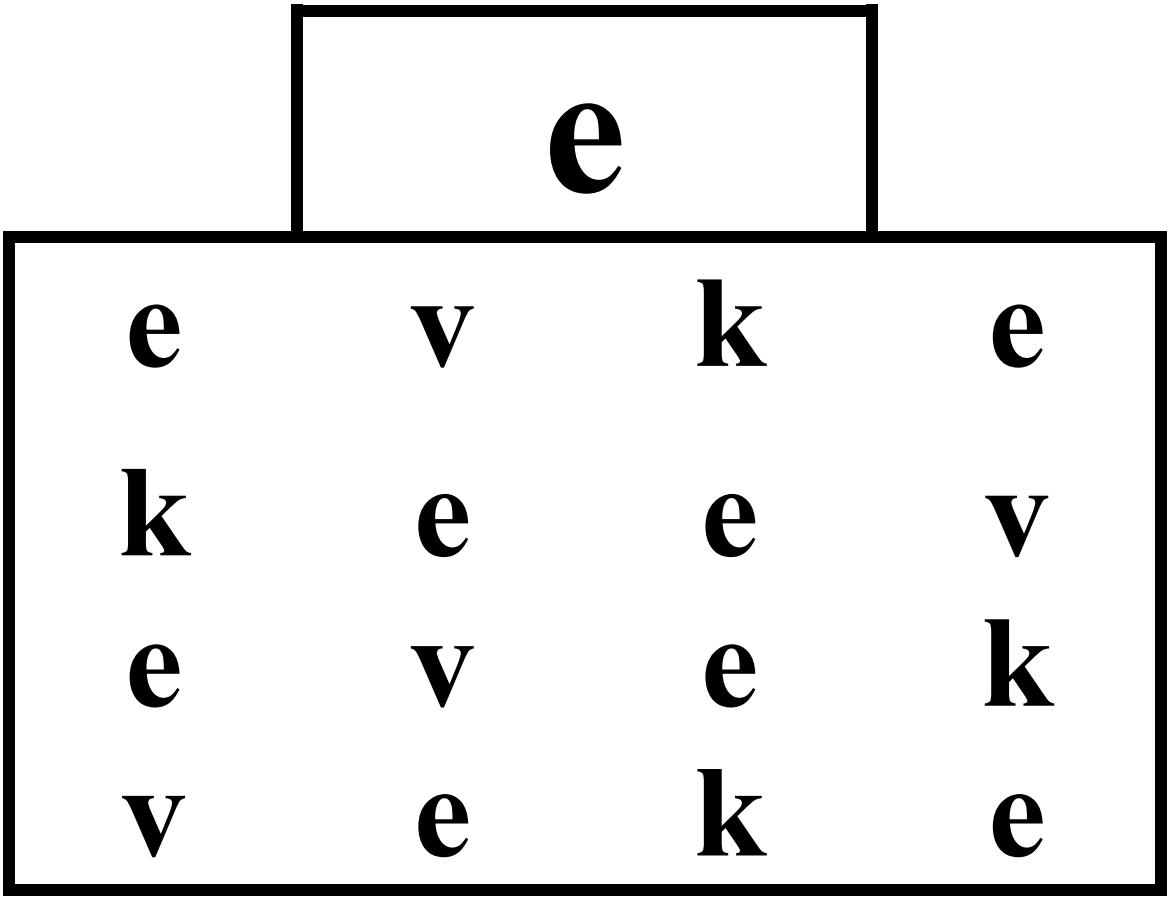

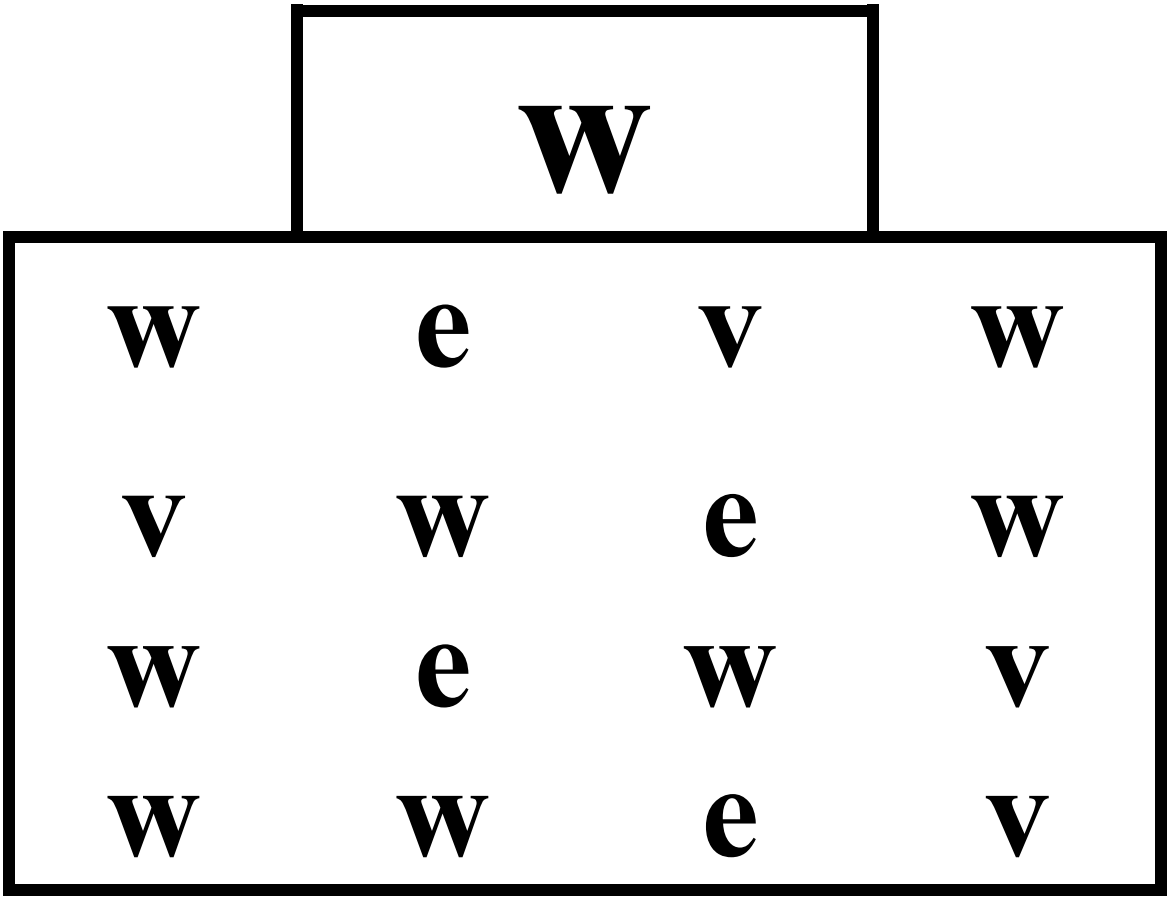
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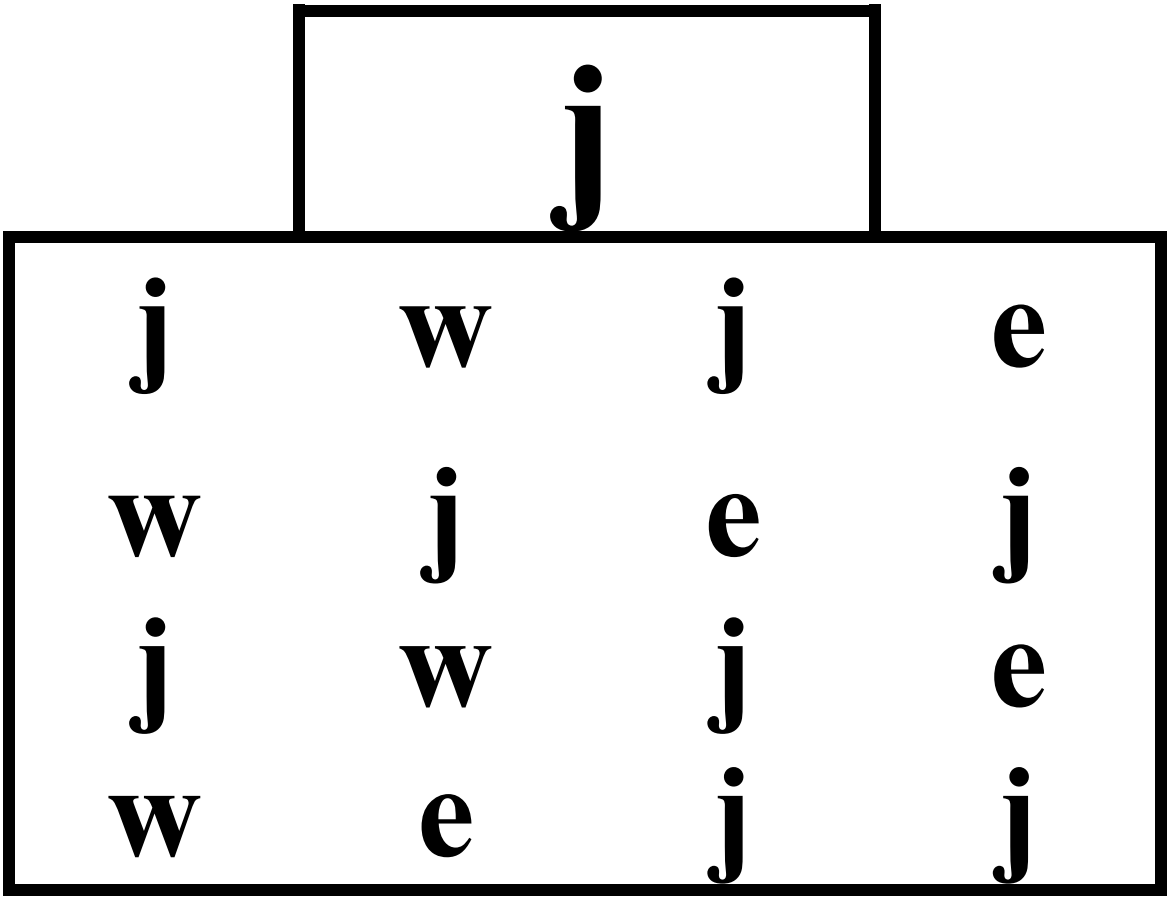
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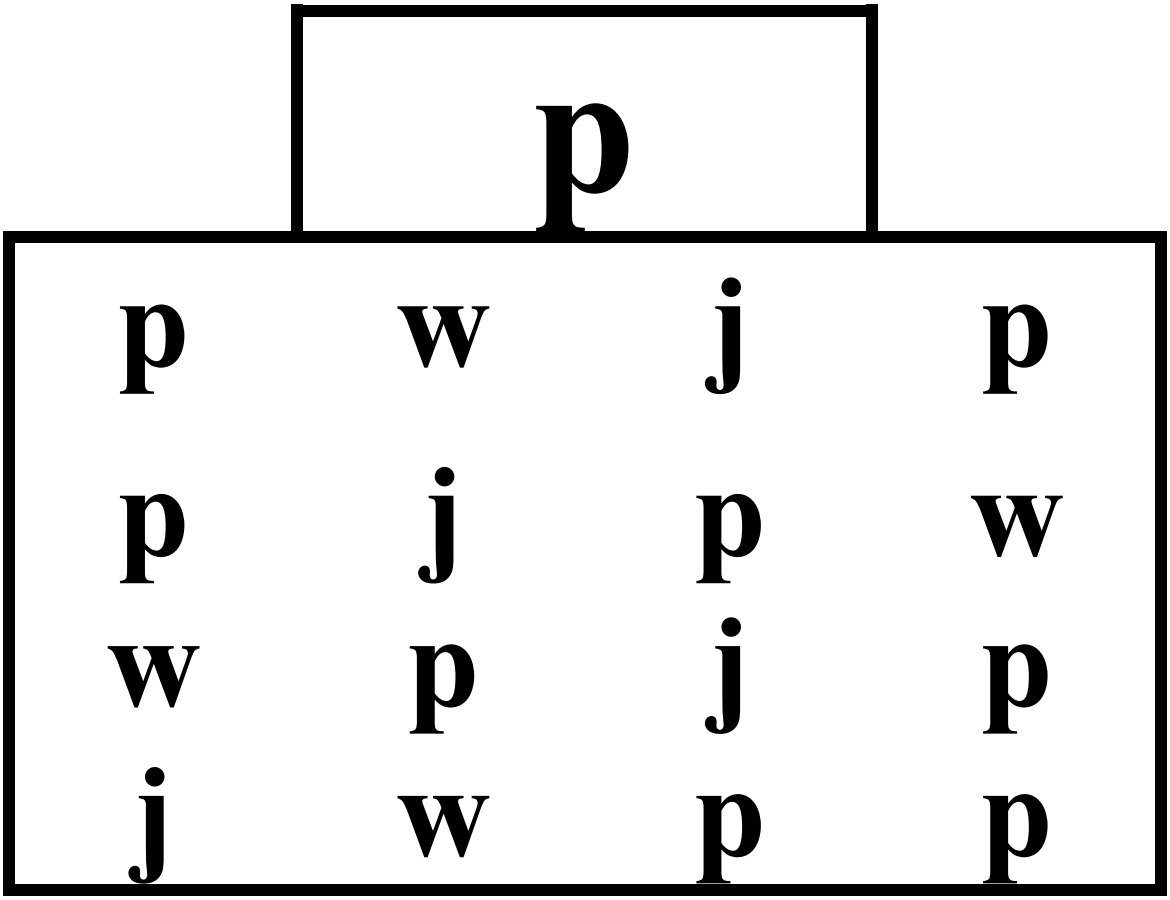

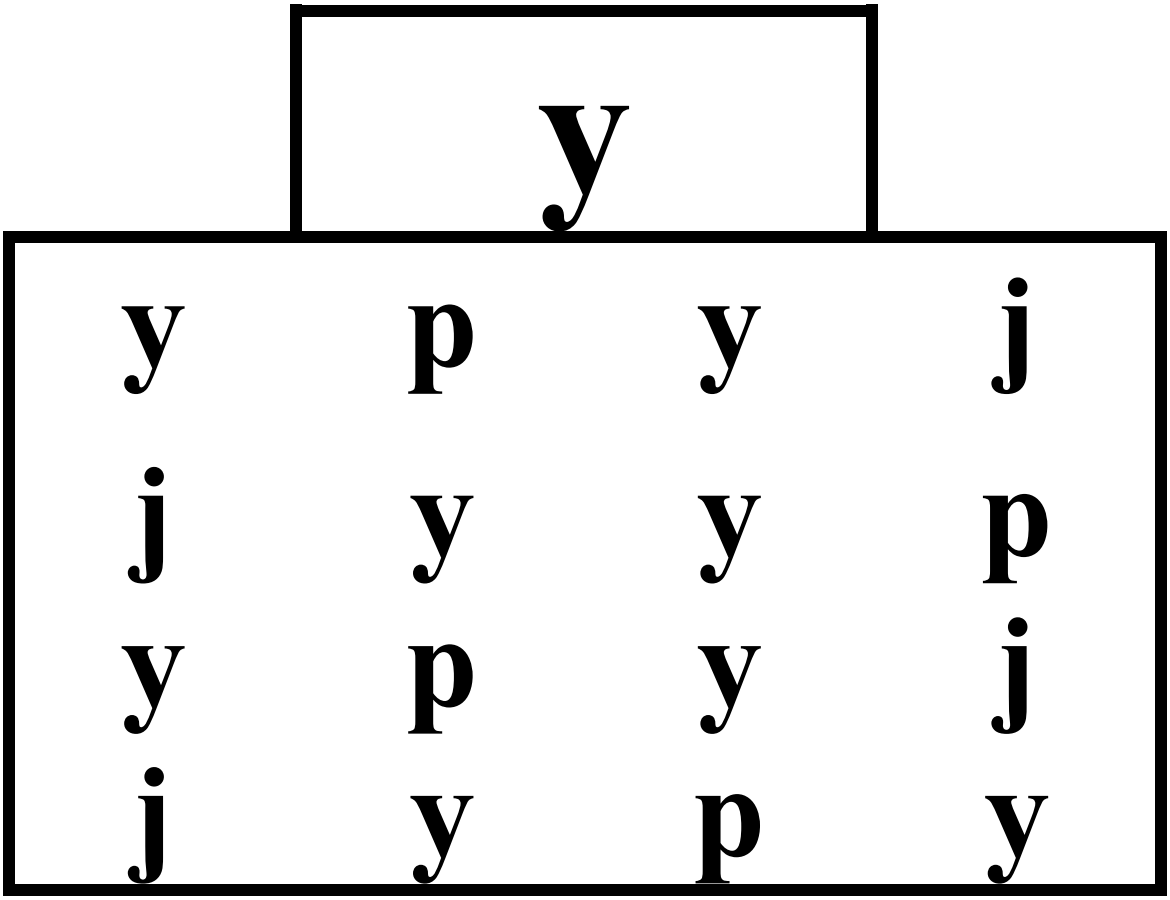
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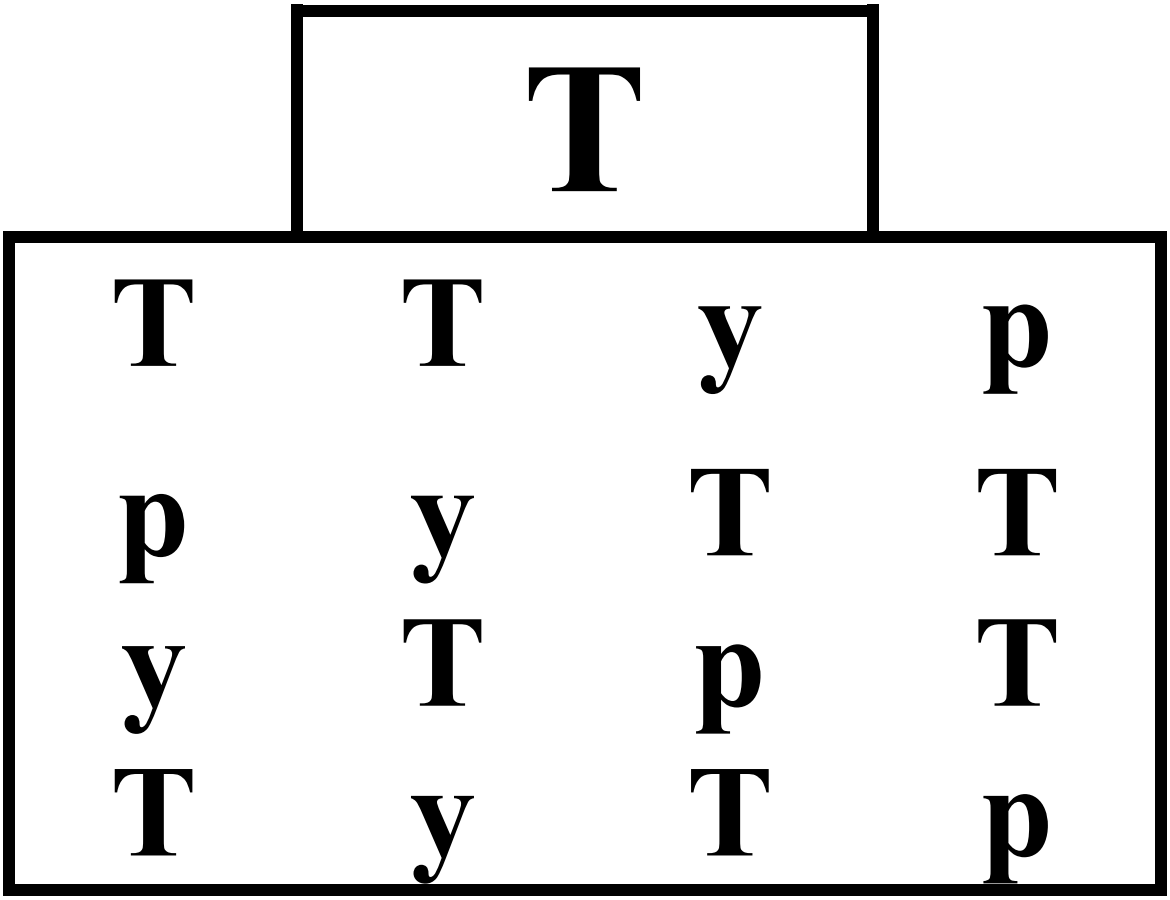
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p y T

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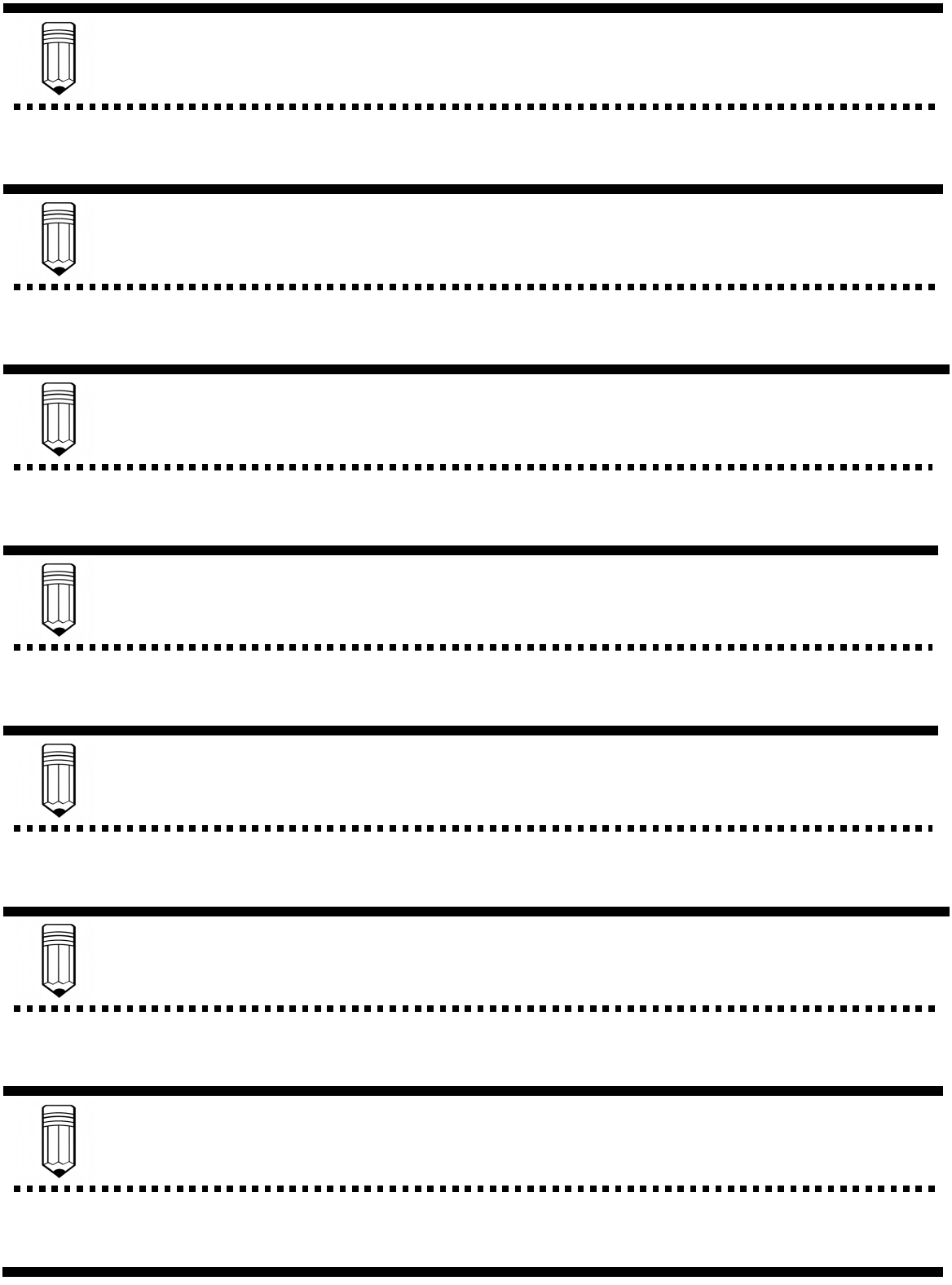
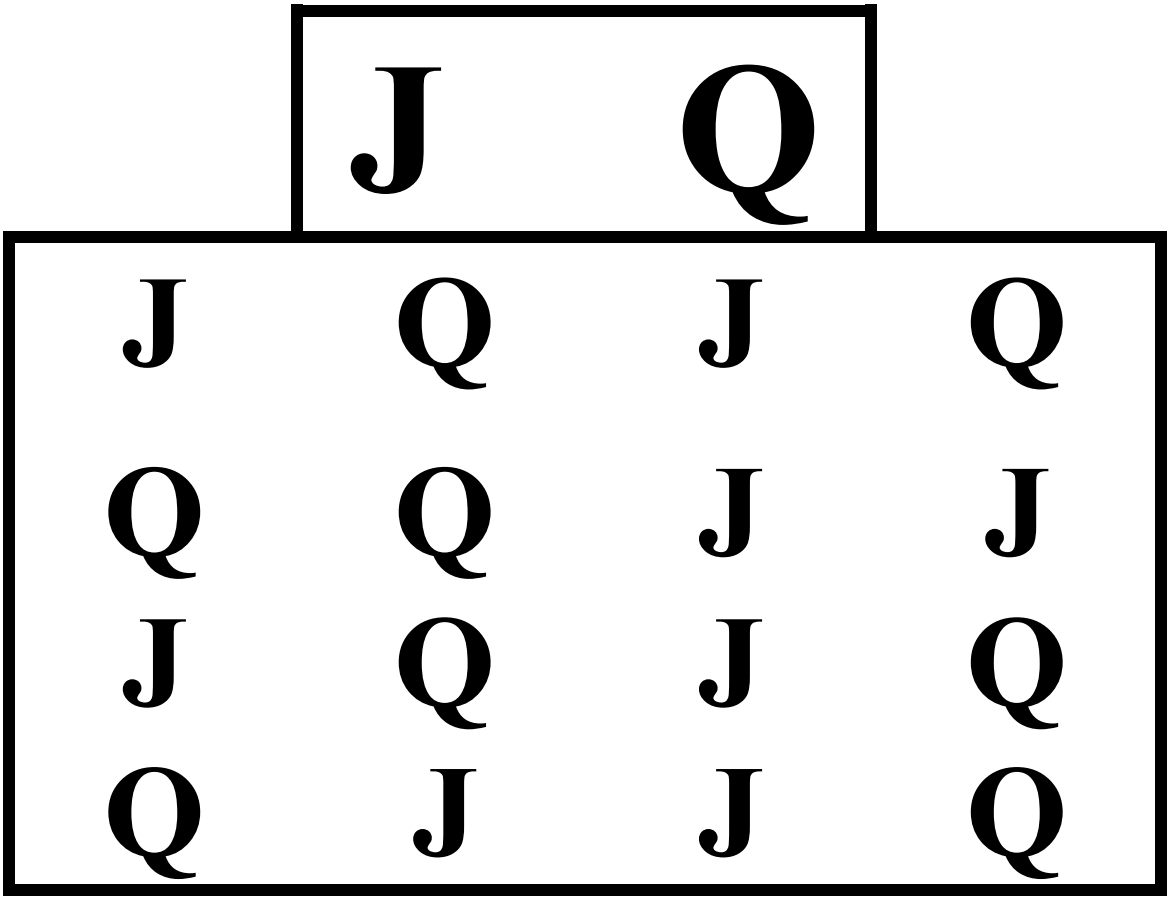
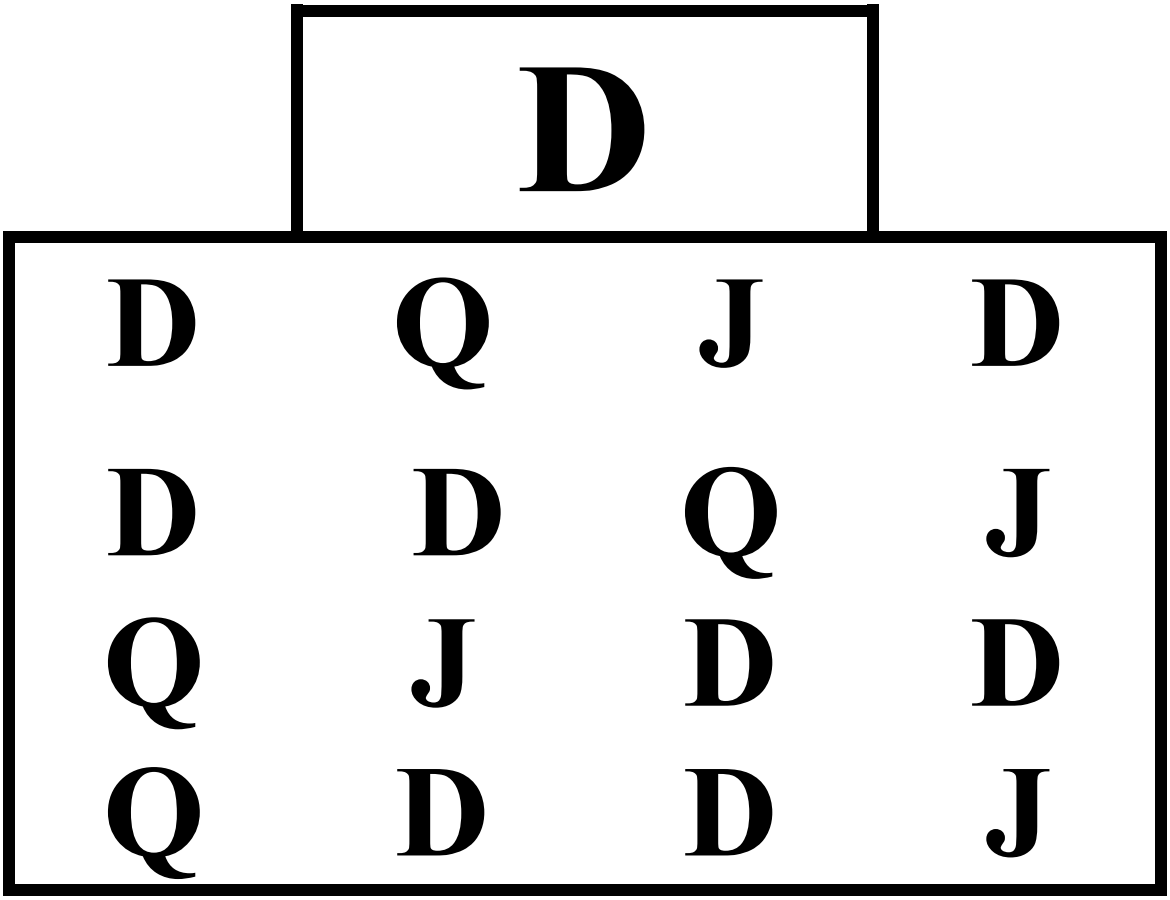
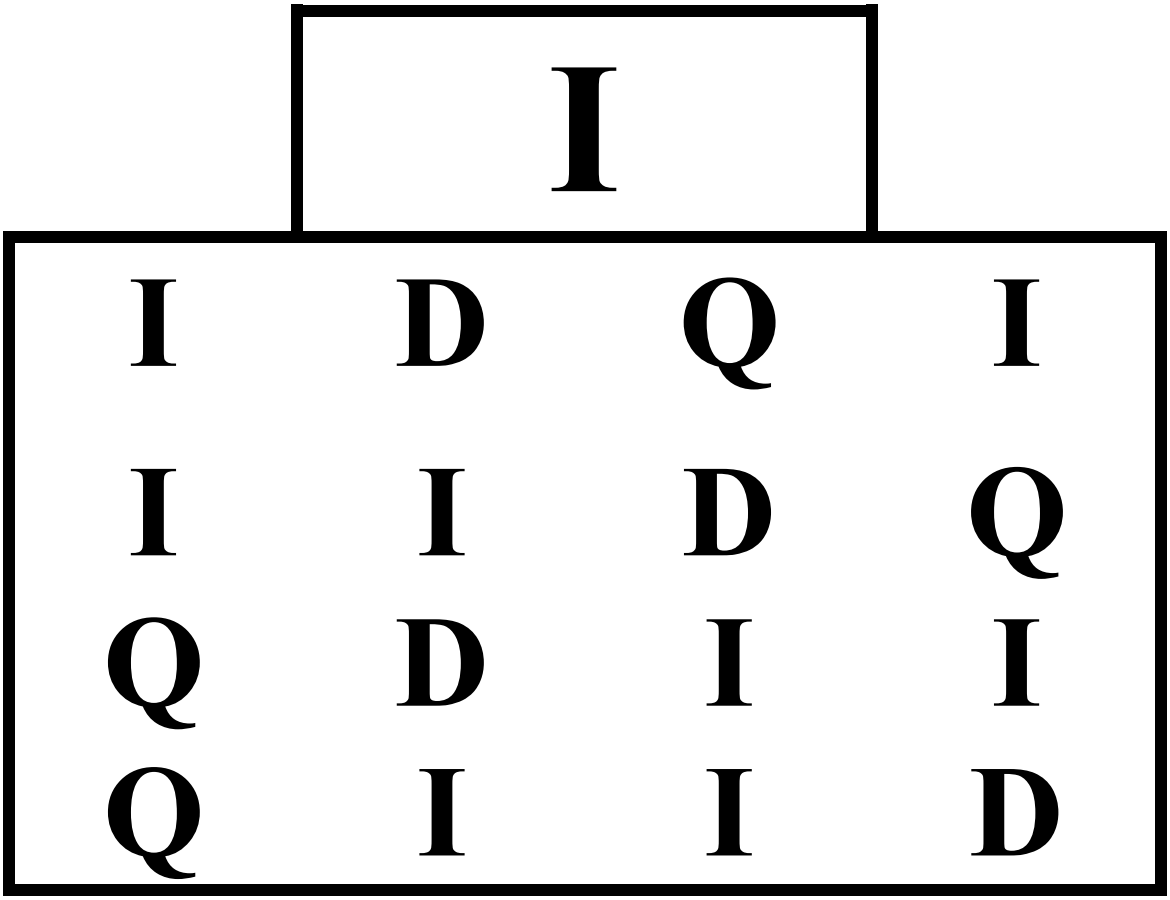
k	L	F	e
b	c	y	p
v	M	y	v
w	L	n	M
e	j	F	p
c	b	T	k
T	e	w	y
j	b	n	F
k	L	M	p

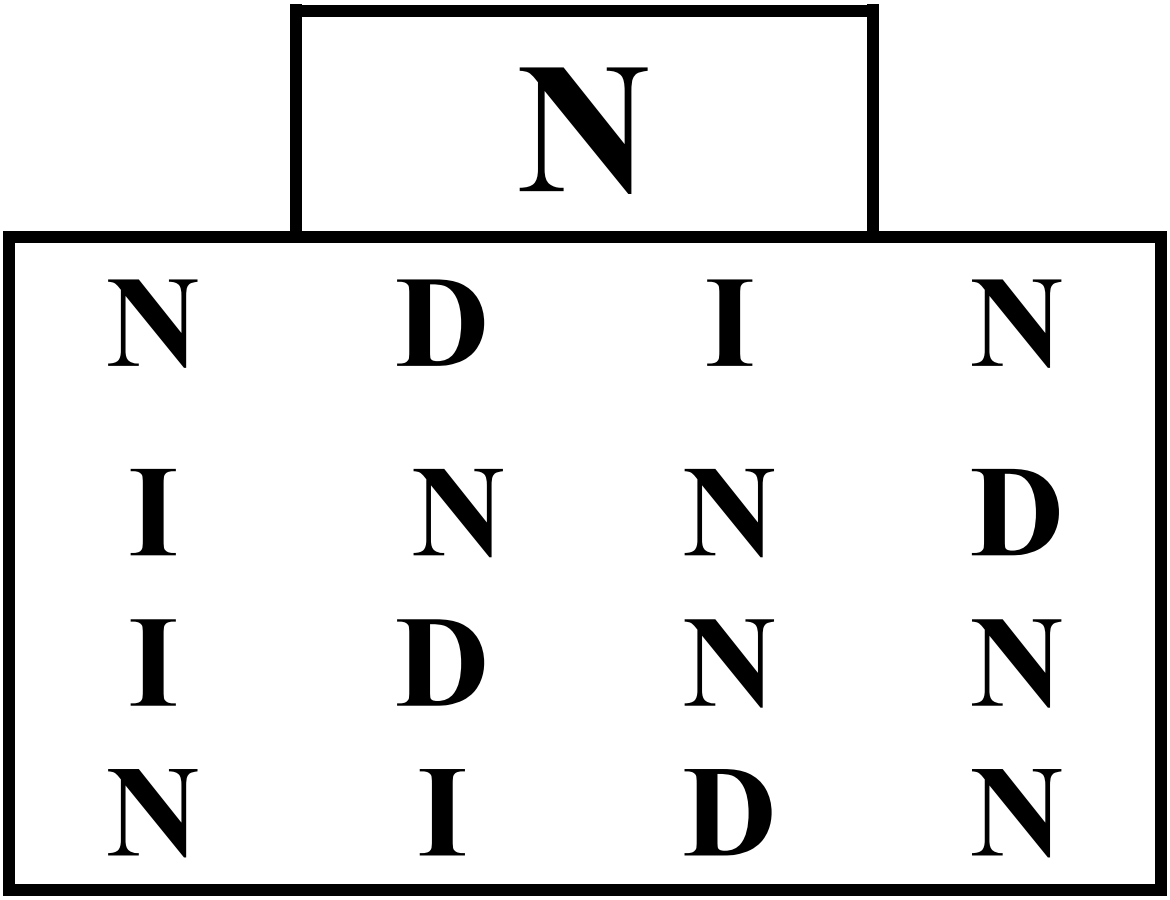


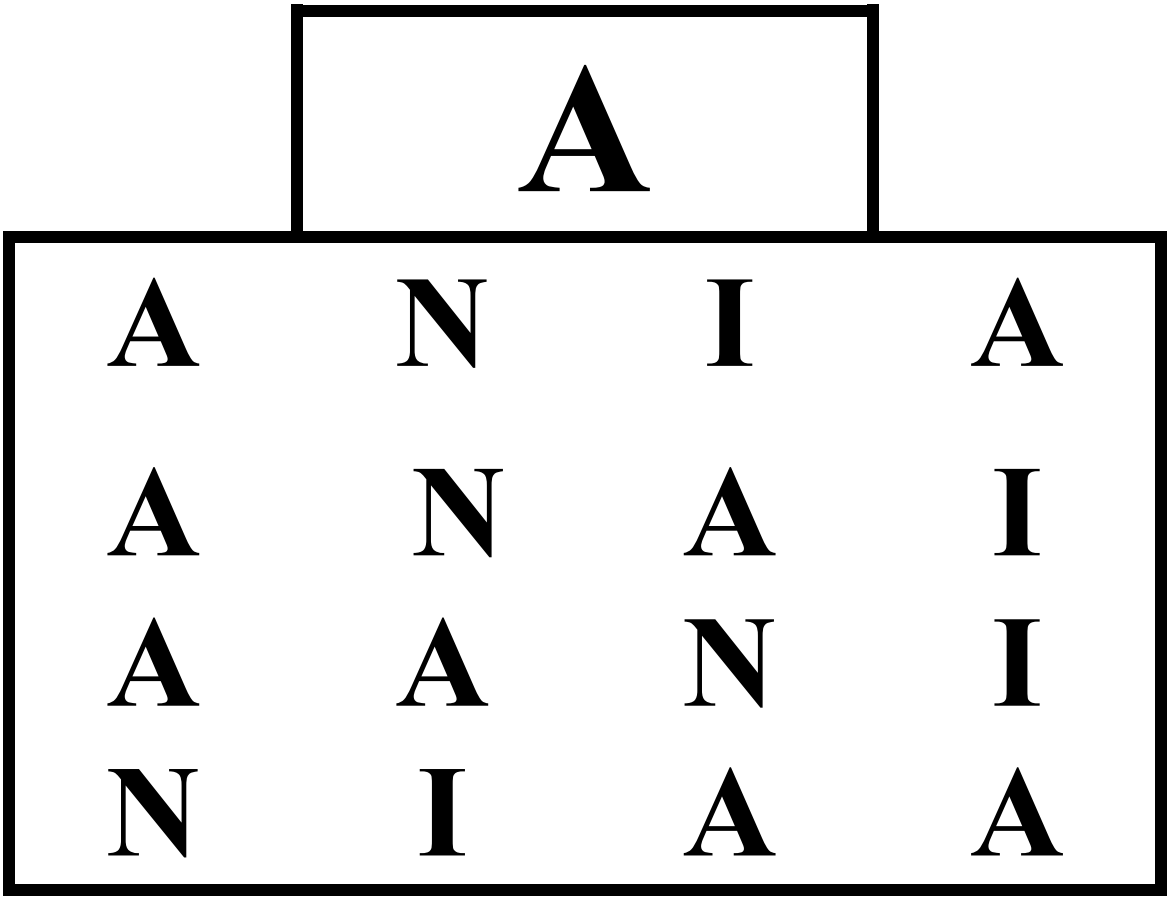

J Q
J Q J Q
Q Q J J
J Q J Q
Q J J Q

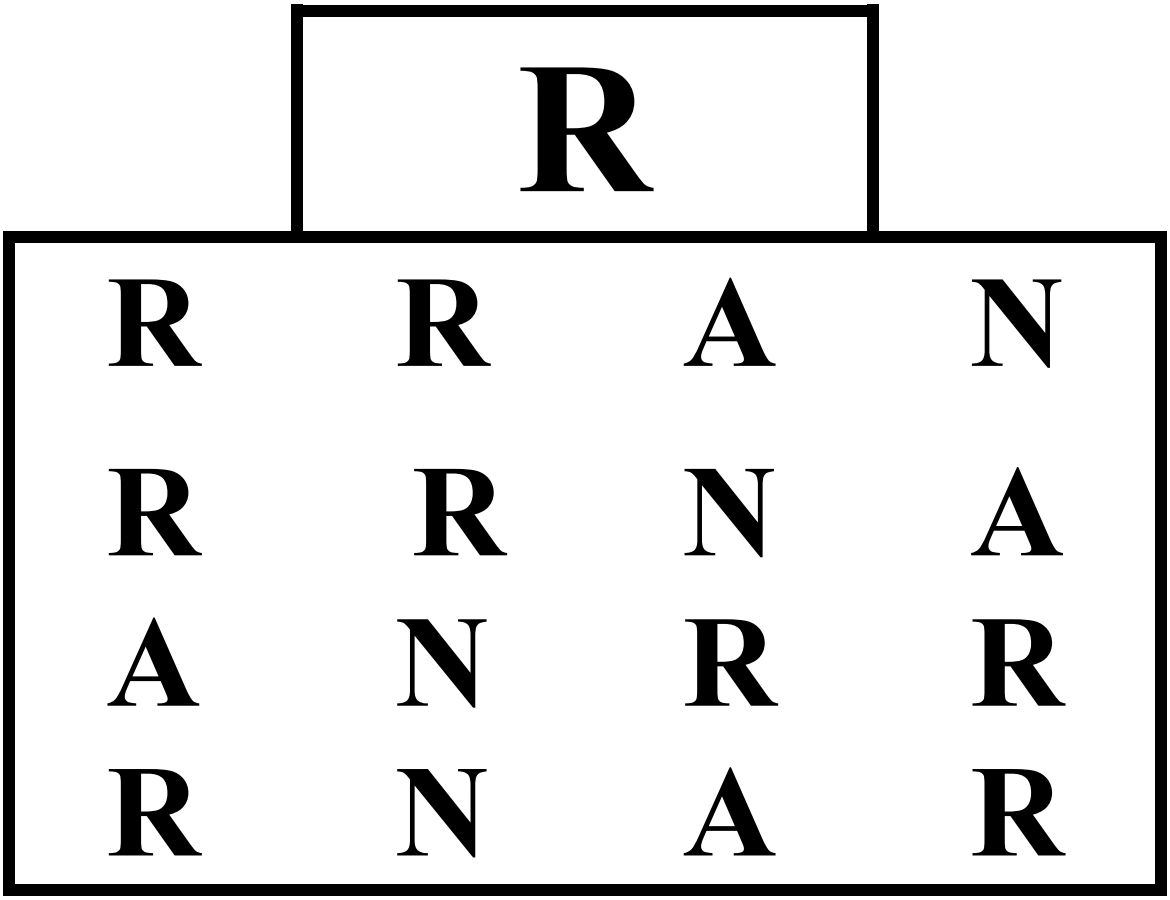

D
D Q J D
D D Q J
Q J D D
Q D D J


I
I D Q I
I I D Q
Q D I I
Q I I D

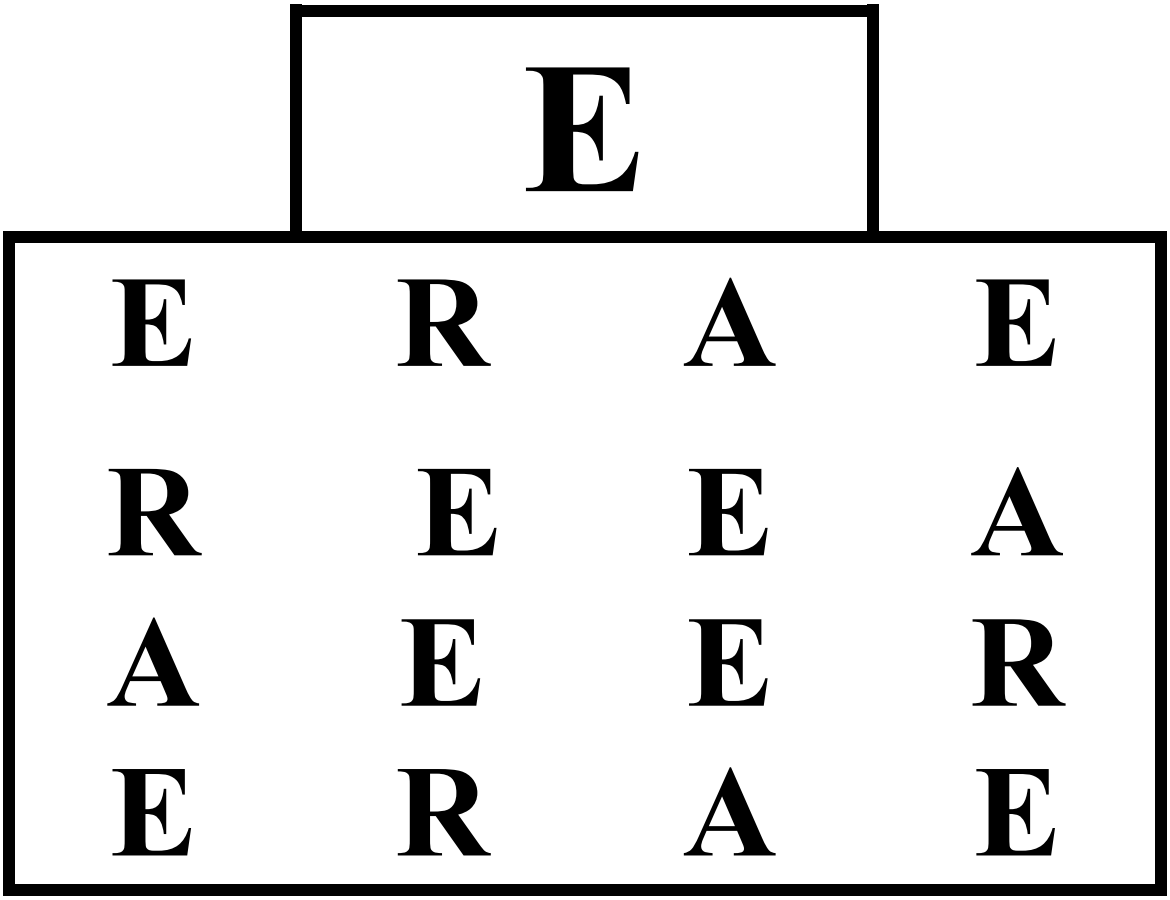
J Q D I

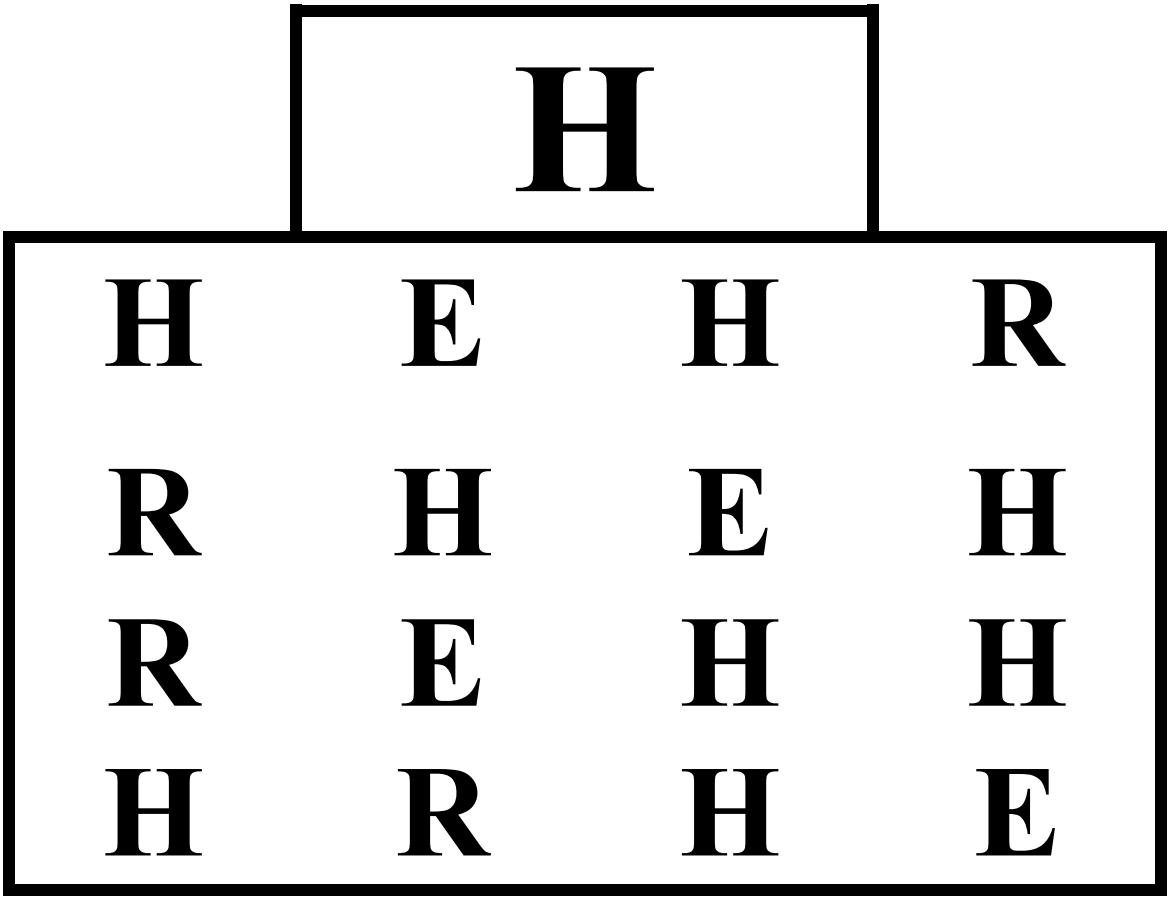


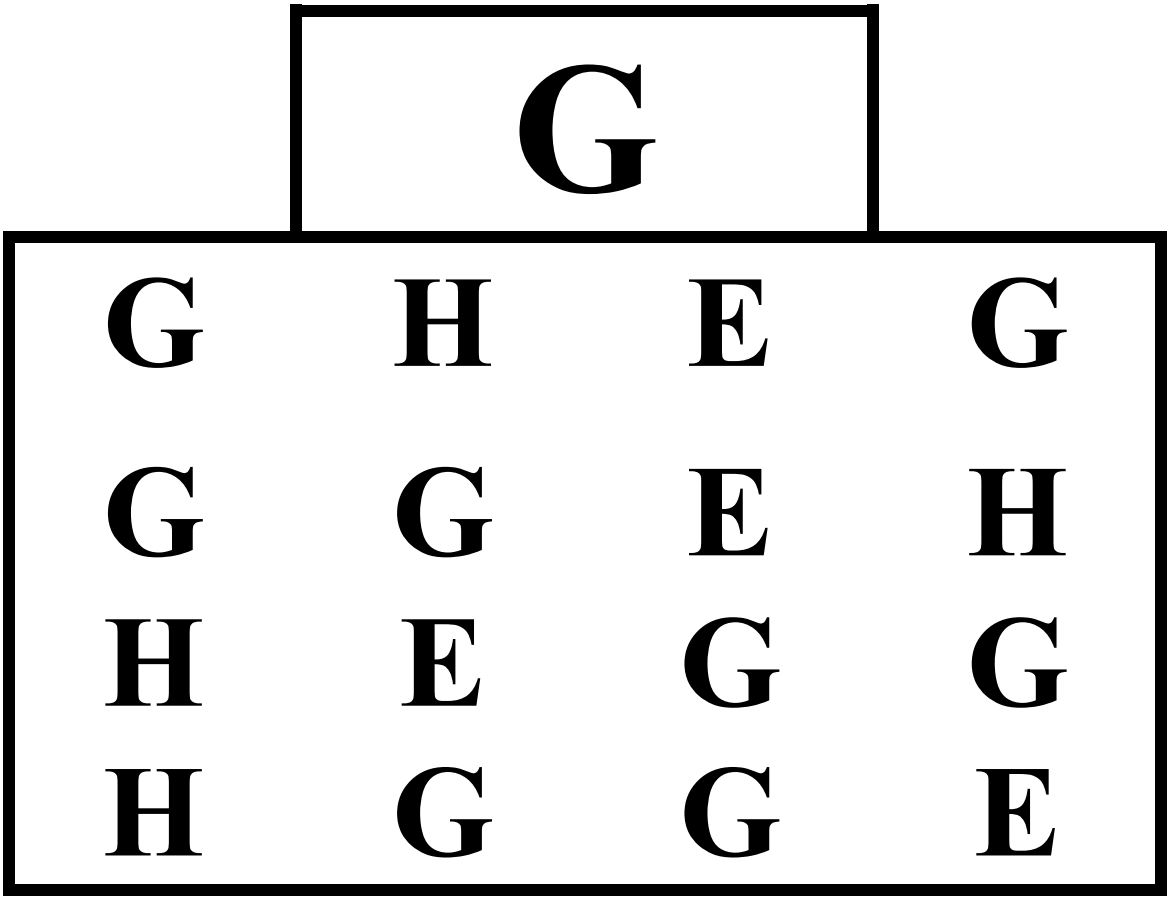

A
A N I A
A N A I
A A N I
N I A A


R
R R A N
R R N A
A N R R
R N A R

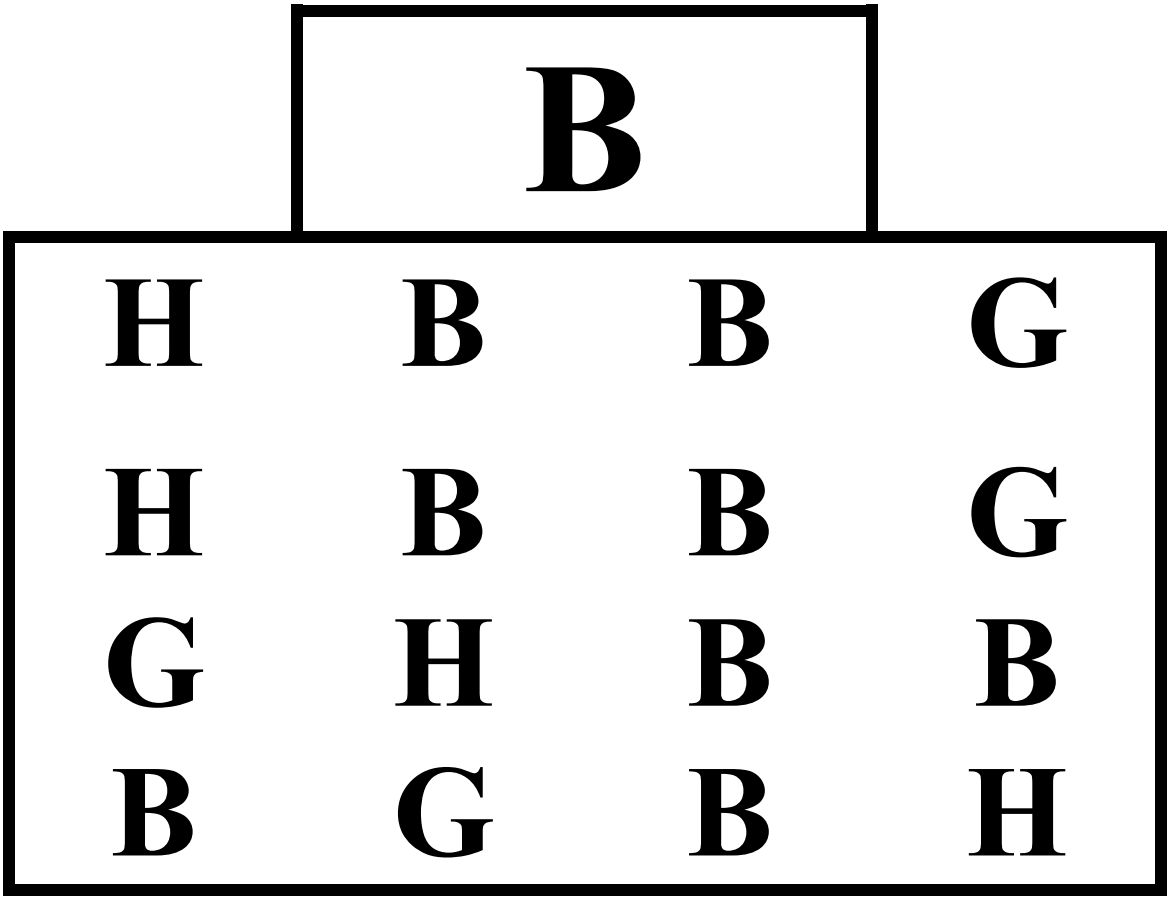
N A R

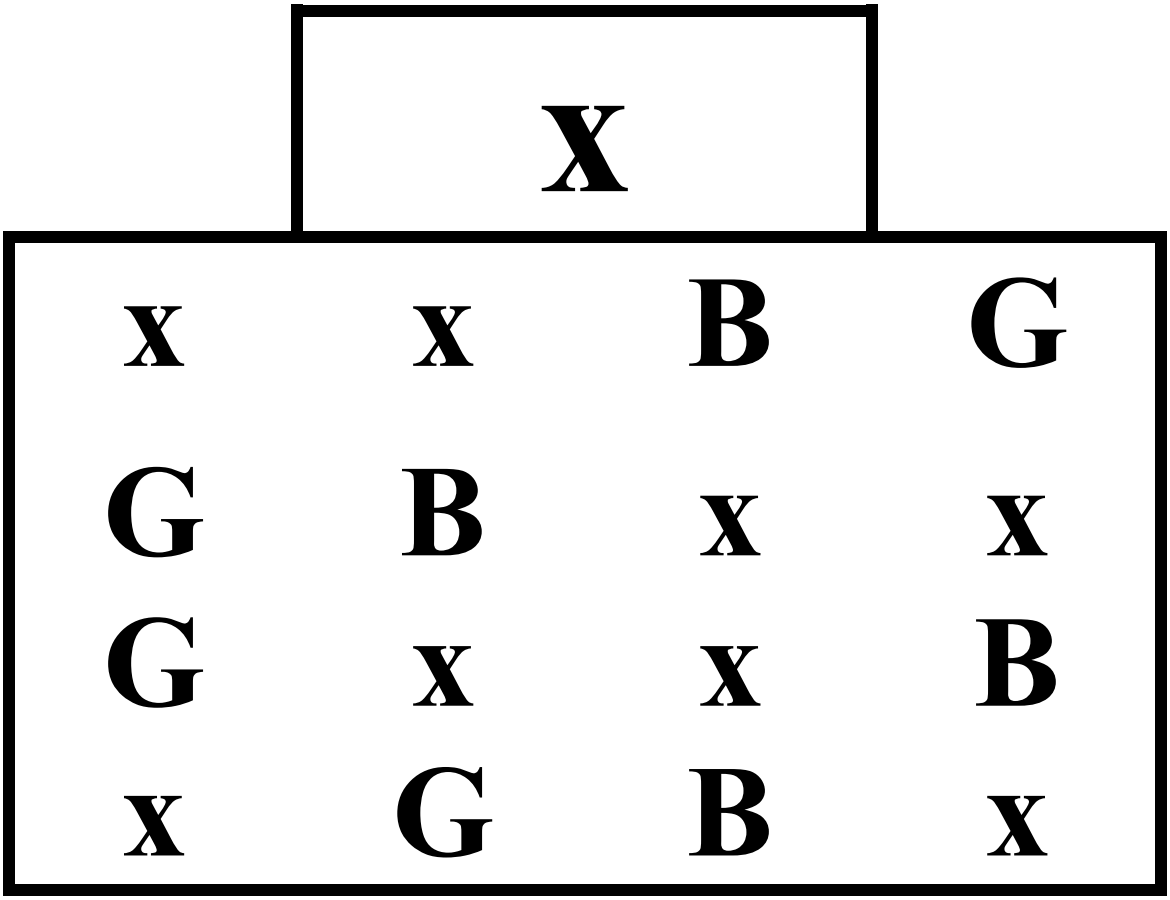


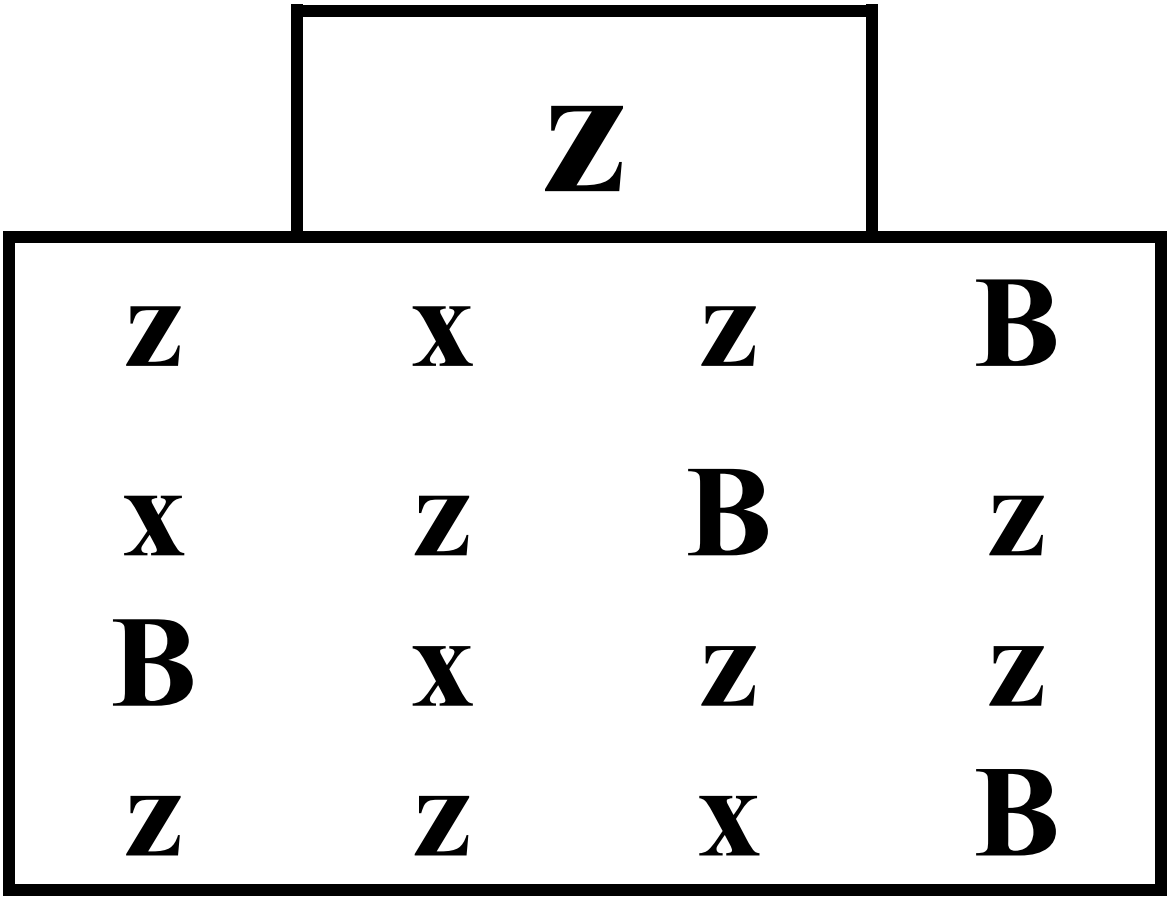

H
H E H R
R H E H
R E H H
H R H E


G
G H E G
G G E H
H E G G
H G G E

E H G




X
x x B G
G B x x
G x x B
x G B x


Z
z x z B
x z B z
B x z z
z z x B

B x z

R	H	B	x
Q	z	J	E
I	N	A	G
H	Q	z	G
x	E	I	J
B	N	R	A
R	H	I	Q
G	x	B	A
N	z	J	E